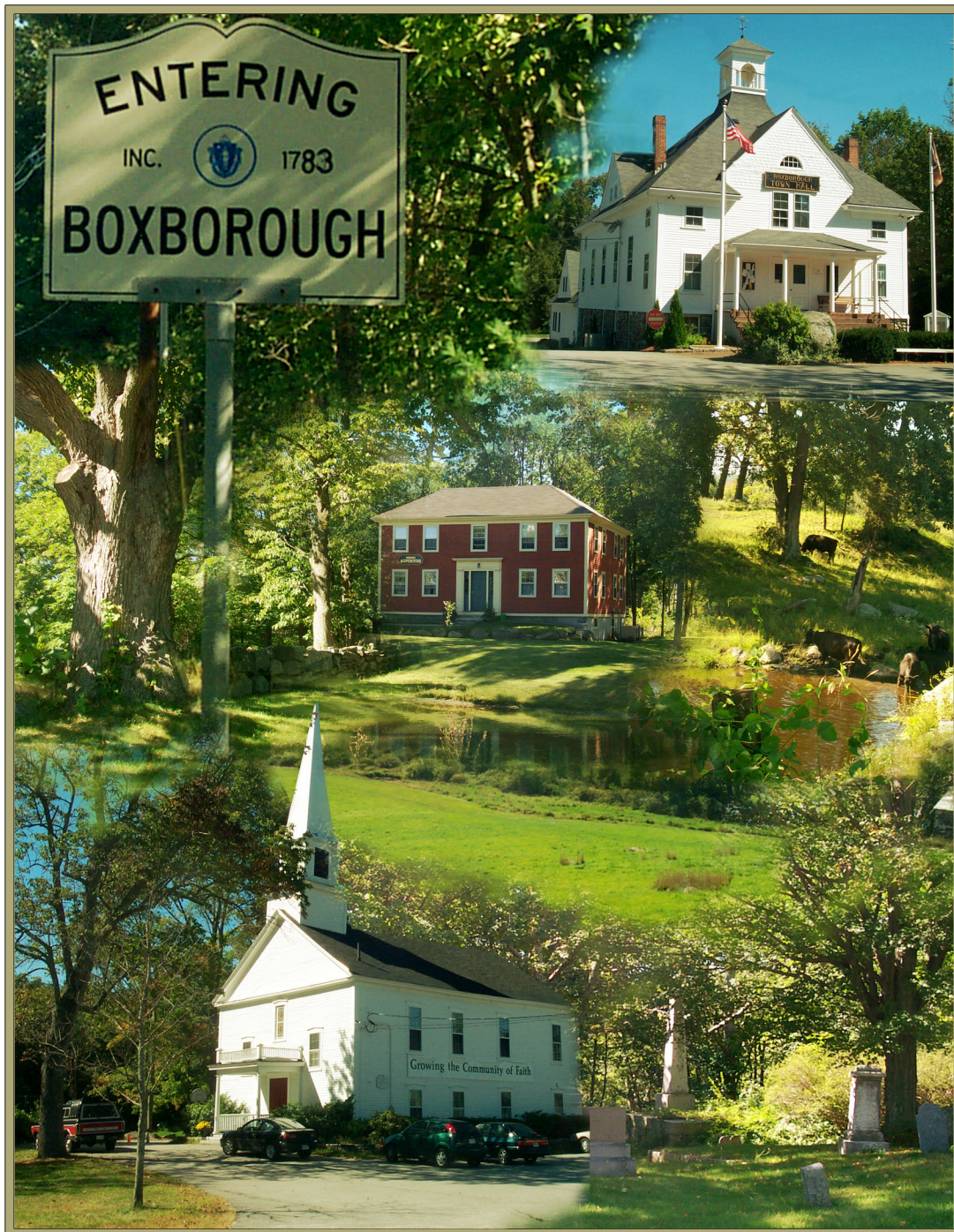


BOXBOROUGH MASTER PLAN

SUBMITTED TO: TOWN OF BOXBOROUGH JANUARY 29th, 2002



SUBMITTED BY:

BEALS AND THOMAS, INC.

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GLOSSARY OF TERMS

Affordable Housing – Housing for households with low or moderate income (50-80% of the regional median income). These limits provide for families with incomes of approximately \$42,000 - \$56,000, depending on family size.

Agricultural Preservation Restriction (APR) – Under MGL Ch.132A, Section 11A permits the Dept. of Food and Agriculture to purchase the development rights so that agricultural land is protected from development.

Buildout – This is the condition that would result if all of the developable land in a community were developed under current zoning.

Chapter Lands – MGL Chapter 61, 61A and 61B restrict the use of land in exchange for significant reduction in taxes. These are not permanent restrictions and the property owner may sell the land to the town without tax penalty or on the market at a significant tax penalty. Chapter 61 refers to managed forest land, Chapter 61A refers to agricultural land and Chapter 61B refers to private recreation land.

Comprehensive Permit – MGL Chapter 40B provides an incentive for the creation of affordable housing through a form of “one-stop shopping” via the Board of Appeals, which may grant a permit and waivers, including significant density bonuses, that are typically granted by several local boards. A Comprehensive Permit, such as the one granted for Boxborough Meadows, allows a developer to seek waivers from local bylaws, but does not exempt him from seeking permits that are granted under State law such as the Wetlands Protection Act.

Demolition Delay - Demolition delay bylaws require developers of land with structures more than 50 years old to wait until a given period of time, usually 6-12 months, has elapsed before they can demolish the structure; however, the Historical Commission can approve a replacement structure before the elapse of the time period, if the structure is consistent with the style of architecture, scale or massing of the structure being torn down. The idea is to slow the demolition of historic structures and give developers time to think creatively about preserving the structure rather than tearing it down.

Floor Area Ratio (FAR) – A measure of the bulk of a building. The amount of floor area of a building as it relates to the area of the lot.

Historic Districts – Under MGL 40C a town may designate an area as a historic district. This requires research to authenticate the buildings within the desired area, a vote of Town Meeting to designate the district, and the appointment of a district commission. Once designated, the commission must approve all exterior changes to buildings and structures in the district.

Inclusionary Housing – Affordable housing units that are created by the joint participation between a local community and the private development industry as part of other development taking place in the community.

MAGIC – Minuteman Advisory Group on Interlocal Coordination, a subarea of MAPC.

MAPC – Metropolitan Area Planning Council, the regional planning agency of which Boxborough is a part.

Mansionization – This is a term given to the increase in the size of typical houses that are currently being built. These are often very large single-family homes that appear too big for the lots on which they are located or houses that are significantly larger than the other houses around them, and are especially an issue of concern where large homes are constructed on grandfathered non-complying lots.

MGL – Massachusetts General Laws.

Performance Zoning – Zoning based on the carrying capacity of the land rather than geographic districts.

Site Plan Review – Site Plan Review is a local review of an application that generally cannot be denied by the reviewing board. The purpose of the review is to address the potential impact of the development on such things as the provision of utilities, cutting of trees, impact on historic resources, provision of means of access and the like.

Special Permit – Special Permits are authorized under MGL Ch. 40A, Section 9. They permit the Special Permit Granting Authority, usually a Planning Board or Board of Appeals, to act on applications for uses or developments that may be appropriate in a particular district, but have the potential for adverse effects that make town oversight desirable.

Scenic Road – A road designated by the town under MGL Ch, 40, Section 15C as scenic, not including State-numbered highways such as Route 111. Certain restrictions apply to the cutting of trees and removal of stone walls.

Subdivision - A subdivision is the division of a parcel into two or more lots and roads on which lots have frontage. The division of a parcel that already fronts on a road is not a subdivision; it is a division of land, commonly called an Approval Not Required (ANR) Plan.

Transferable Development Rights (TDR) – TDR is a tool for protecting open space by transferring the right to develop from a parcel in one part of town, that is desirable to preserve as open land, to a parcel in another area of town where development is more desirable, thus maintaining the overall density in the community.

Variance – A variance is different from a special permit in that the desired use or dimension sought is not permitted. Variances may be granted under MGL h. 40A Section 10 due to circumstances that pertain only to soil conditions, shape or topography of the lot in question, that literal enforcement of the bylaw would result in a substantial hardship, and that the desired relief from the zoning bylaw can be allowed without substantial detriment to the public good.

Zoning - The practice of identifying specific allowable or prohibited uses according to the location in which a property is located, including the limitations of the uses that may be allowed in a district. Zoning bylaws are the regulations that describe such uses and are authorized by the state Zoning Act, MGL Ch. 40A.

EXECUTIVE SUMMARY

For the past year the citizens of Boxborough have come together as a community to formulate the town's first master plan. This has been a rewarding experience that has allowed participants to discuss a variety of topics and to frame policies that will guide the town into the future. These discussions have produced a wide range of opinion about what is important to the quality of Boxborough life and have raised many questions about the future growth and development of the town. What makes the town special? How can the town accommodate economic expansion that is needed to balance the tax base with the need to protect the environment? How should the town protect the environment? Does the town have the resources it needs to achieve its goals?

The answers to these questions and many others are woven into the fabric of this document. This is a planning document that town boards will use to help make clear, consistent and fair decisions. It is not a formula, but a framework for decision-making, identifying choices necessary to meet public goals. These include not only the permanent protection of open land, environmental resources, and scenic qualities that form the physical character of the town, but also the provision of housing for people of all ages and incomes, an economic base providing good jobs, and the continued provision of high quality public services, programs and facilities.

This master plan is a guide. It is not a substitute for local rules and regulations for legislative action, but it can be the foundation for the adoption of regulatory change, the acquisition of land for a variety of public purposes, and fiscal decision-making. Nor should the master plan be a static document, but rather a dynamic policy instrument that should evolve with periodic reviews to consider citizen comment and the experience of town boards and commissions on specific issues and projects.

The following four statements encompass the vision for the town. Each of these statements, however, brings many choices for the people of Boxborough.

- Keep the small-town, rural atmosphere of the town and its sense of community;
- Protect the openness of the landscape and environmental resources, especially the water supply, through regulation and/or acquisition;
- Maintain the things that comprise the character of the town such as scenic roads and vistas and historic buildings, especially along Route 111;
- Maintain the high quality of public services and the school system.

Sense of Community

How do you keep a town that has grown 46% in population in the past decade "feeling" small? One of the things that many people like about Boxborough is the sense of community, feeling connected, and knowing who their neighbors are. They fear that as the town grows in population, it will be harder to maintain that small town feeling. The population of Boxborough is approaching 4,900 people. Under current zoning if all the developable land were to be built upon, the population would be more than 6,900. Although 2,000 people may seem like a small number, it represents a population increase of 40%. The number of households would also increase by almost 50%. These changes would have significant impact on town services, especially the school system, which might experience a 100% increase under current zoning regulations.

As the town grows, the social and cultural elements of the town become more important in keeping a sense of community. The fact that Boxborough has only a few places to meet is both an asset and a liability. Because there are a limited number of places to connect with others in the community, people's paths often cross at these facilities: Blanchard Memorial School, the church, Town Hall, the post office, and the library. But there are few places for people to sit and socialize. The potential development of the Town Center offers the opportunity for such meeting places, as does the proposed expanded town library.

Maintaining and building a sense of community often involves housing – what type, what cost, what location. The citizens of Boxborough have stated that they want to make housing available for people of all ages and incomes; however, recent housing market trends are not consistent with this goal. Newly built houses are very large and expensive and, for the most part, out of reach economically for those residents who have lived in the town for a while. There are few housing options for older people, teachers and other people who work for the town, and people who have grown up in Boxborough and want to buy a home in the town – first time homebuyers. The Boxborough Housing Board has developed a multi-faceted Long Range Affordable Housing Plan. One thrust is to purchase housing units, primarily condominium units, to maintain their affordability by deed restricting them. Another option for creating affordable housing is for the town to build its own, thereby ensuring control over the design of both the site and the units. The town can also encourage development of affordable housing through regulation that would shift the burden of developing such housing from the town to the developer.

Openness of Landscape

A population increase of 2,000 people at build-out would have significant impact on the landscape. It means that an additional 2,200 acres, one-third of all of the land in Boxborough (approx. 6,650 acres), would be developed, leaving only 1,000 acres of open land. Clearly, if the citizens of Boxborough cherish the open, rural quality of their town, they have choices to make. How much open space do they want to purchase to maintain the feeling of openness? What are the costs of such purchases? Is acquisition the only option?

There are a number of ways that open land can be protected. The first is through education. Although designating land under Chapter 61, 61A, or 61B may protect land on a temporary basis, such designations are not permanent. Owners of open land must be informed about the tax advantages of Conservation Restrictions and Agricultural Preservation Restrictions in order to

voluntarily preserve open land. Obviously, education is the least costly alternative to open space protection. Although the town is forfeiting the taxes that would otherwise be paid on this land, it is gaining open land at a substantially lower cost than if it purchased the land.

A variation on the theme of restriction is partial development. Some owners might want to sell open land. In this case, they may be willing to subdivide a few lots for development while preserving the remainder of the parcel by deeding it to the Conservation Commission or a Land Trust.

Town purchase of land is costly. If all of the chapter lands were purchased by the town, based on their assessed values as open land, the cost would be almost \$5.3 million; market value might be higher. Clearly, this is not economically feasible. The resource sensitivity analysis in this Master Plan is a means for the town to evaluate the value of chapter lands for purchase. Different town boards and commissions using their own evaluation criteria can use this analysis or a similar one of their choosing. For example, if the town wanted to purchase land that most protects water supply, there are six parcels totaling 220 acres that might be purchased. But these lands are located west of I-495 and have little conservation value. There are nine chapter land parcels, totaling 154 acres that would have conservation value. Housing advocates might prefer to purchase several parcels of land for affordable housing. None of the parcels for water protection overlap those for conservation; the same might be true for the parcels that promote conservation and housing. However, they all have sensitive environmental receptors, and, therefore, all have an environmental value. Regardless of the reason for purchase of the land, the cost will be high and the town will have to be selective in its choice of parcels.

Finally, the third option for keeping land open is through regulations. Rather than increasing the size of lots, which is one option but not an effective one, the town might allow houses to be built on smaller lots in order to preserve contiguous common open land. We have called this Open Space Residential Design. It is a form of clustering, but it is sensitive to the natural features of parcels and to those that surround them. Such a development would not increase density, but would permit houses to be put on the land in a different way, a way that is compatible with the environment. For smaller developments, the Planning Board might waive strict adherence to infrastructure standards in order to encourage a developer to build fewer units, thus permitting the preservation of open space. One of the advantages of allowing housing to be closer together is that it encourages the creation of neighborhoods that, in turn, fosters the sense of community that Boxborough townspeople cherish.

Retain the Character of Route 111

Other than Route I-495, Route 111 is the roadway along which most people in the town travel. Route 111 is symbolic of the character of the town. Colonial-style stone walls often border the right of way. The trees overhang the pavement to form a canopy that is welcoming and reflective of the town's rural character. Most of the land along Route 111 east of Route I-495 is zoned as Business. Approximately 135,000 square feet of commercial uses exist on more than 48 acres of land; another 306,000 square feet could be built on 58 acres in the Business districts and 250,000 square feet on 57 acres could be developed in the Town Center District along Route 111. If the undeveloped land along Route 111 is developed for business use the character of the roadway could be lost. The designation of Route 111 as a state-numbered highway, not eligible

for "scenic road" status, is a challenge because there is no protection for the stone walls and trees within the right of way. Nevertheless, a number of suggestions have been recommended in this master plan to encourage economic development that is consistent with the character of the town. These include the extension of Design Review to business districts along Route 111, the adoption of design standards for business development in these districts, and encouraging the use of common driveways to minimize curb cuts, and enhancing the aesthetic of the town entrances.

Protect Natural and Cultural Resources

Protecting the natural resources of Boxborough goes hand in hand with the retention of town character and the "feeling" of openness. The loss of resources is directly proportionate to the increase in developed land. Land consumption has been dramatic in the I-495 area in the past ten years and high-tech companies have located in the region, grown, and expanded. In Boxborough the 46% increase in population has come primarily from new single-family homes on previously undeveloped land. This development has put pressure on the natural resources and will continue to do so as more open land is converted. Chapters 6 and 7 describe a process for evaluating parcels of land according to a number of natural resource and community attributes. By using a community ranking of these attributes and then applying them to specific parcels, the town can rank the parcels for open space acquisition. The same system can be used to identify parcels for affordable housing development.

Both natural and cultural resources feel the pressure of development, particularly historic buildings and sites. The town has taken the first step in protecting these resources by voting to fund a survey of historical properties. Such a survey will help identifying the more critical historical resources that, if concentrated in one location, could then be designated as an historic district.

High Quality Public Services and Facilities

Growth directly affects the demand and need for town services and facilities. As the town's population approaches 5,000, there is more demand for all town services. This master plan estimates that the town will need an estimated 15-20 more employees (police, fire, library, recreation, and administrative staff) to serve the additional residents at build-out. Boxborough spends a lower percentage of its budget for some town services (police, fire, public works, and recreation) than the statewide average and significantly greater percentage of the budget for education and debt service; however, the education figure is consistent with other communities with high incomes and educational levels. These figures reflect the town's value of good public education.

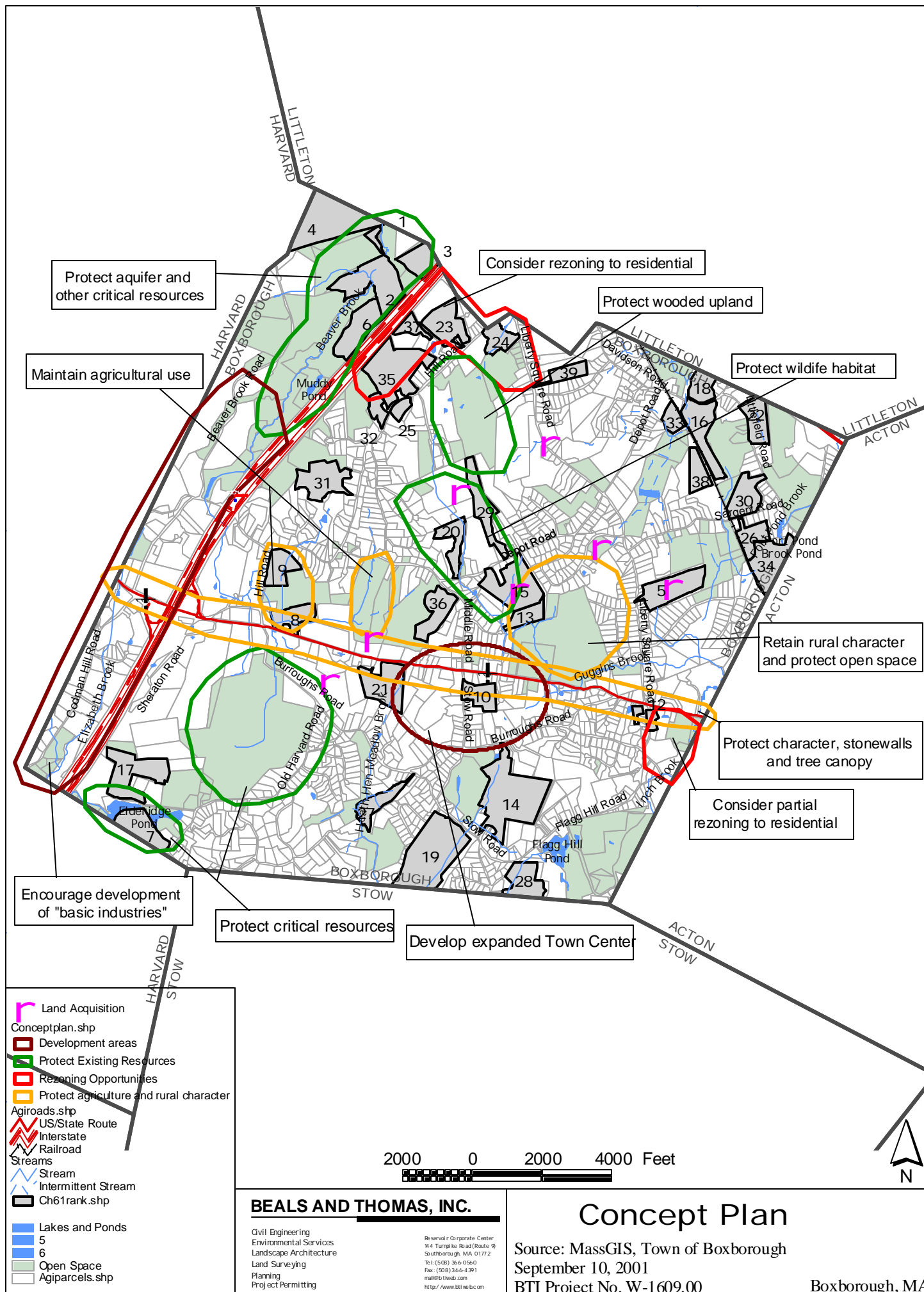
Of primary concern will be the capacity of Blanchard Memorial School. Although the annual number of new elementary school children in Boxborough has decreased recently, the school is approaching capacity. Families moving into town have more children than the town-wide average; however, from an analysis of the family composition of these new families it appears that the children in them are primarily middle school age. Detailed 2000 Census age breakdown information will provide a better understanding of the recent trends.

Although the current demands for water are being met, there is concern for the water quantity and quality available to residents in the future. A potential 40% increase in population could

mean that water usage would increase of an estimated 150,000 gal./day. Another estimated 245,000 gal/day could be used by new commercial and industrial uses. The town is currently studying its water supply. Results from that study should give a more accurate picture of the capacity of water resources for the town. When that study is complete, build-out figures should be reevaluated. Because Boxborough has no infrastructure for public water and wastewater and must draw its water supply from aquifers and bedrock fractures, development must be carefully planned so that it does not threaten the many private wells in the town.

Conclusion

Chapter XI, Acting on the Vision, lists many specific actions townspeople can take to implement this Master Plan. The over-arching theme of the goals, objectives, and actions is that Boxborough wants to retain its rural character that is defined by such attributes as open land, scenic vistas, historic buildings, and stone walls along tree-lined narrow roads, and a "feeling" and quality of life that results in people caring deeply about their town and being involved in it. At the same time, residents recognize that a balance is needed and that setting limits that are too restrictive will constrain economic development and provision of affordable housing. The people of Boxborough acknowledge that change will occur and that the town will grow. This document will allow the town to manage that change. This executive summary broadly outlines the goals and the means for achieving them. By using the master plan as a guide, Boxborough can prevent the loss of those characteristics that make the town a unique place to live and work.



PREFACE

INTRODUCTION

The Boxborough Master Plan is the result of a year of data collection including interviews, committee meetings, public workshops, and analysis of natural resource protection needs, community desires, and economic, aesthetic, and public services issues. It is intended to be action-oriented, user-friendly, and well suited to Boxborough, with a strong emphasis on recommended implementation strategies including regulatory change. The public process has been a cooperative effort of the Boxborough Master Plan Committee with consultant assistance of Beals and Thomas, Inc. and additional expertise offered by Brown & Brown, PC and McMahon Associates, Inc.

Master Planning is a balancing act - every community is different. In Boxborough, the natural environment is critically important to the community. The approach to this planning effort therefore, has been natural resource-based, focusing on the development capacity of the land, while considering community needs. Land use is intimately tied to the regulations that affect property within a community. This process has defined a realistic vision for Boxborough in terms of community character, economic vitality and resource preservation, and developed a framework for achieving that vision through regulation, incentives, or disincentives.

This master plan document is formatted to summarize key goals, objectives and issues; document community needs; and provide specific action items with clear direction for their implementation. It is supported by recommendations and related legally defensible, regulatory changes. The plan includes the following sections or chapters:

- *A Vision for Boxborough*
- *A Picture of Boxborough*
- *Land Use*
- *Economic Climate*
- *Natural and Cultural Resources*
- *Open Space and Recreation*
- *Public Services*
- *Traffic and Circulation*
- *Regulatory Environment*
- *Acting on the Vision*

THE NEED FOR A MASTER PLAN

Like many communities that are rural or suburban in nature, Boxborough is experiencing dramatic growth. This growth is occurring for several reasons: changing demographics, individual desire to improve one's quality of life, a trend to get away from the city, and a willingness to commute or telecommute. Regardless of the reason, Boxborough faces pressures on its land, infrastructure, schools, and other public services. This growth comes with changes in the physical environment, as well as residents' perceptions about their community. According to a 2000 town-wide survey, conducted by the town, the majority of residents who did not grow up in Boxborough were attracted to the town because of its character and their feelings that Boxborough was a good place to raise a family and the availability of housing at affordable prices. To many however, the town is growing too fast. It appears clear that Boxborough is valued for its rural character and the people that help to create a community fabric. Residents want to protect these assets as Boxborough manages future growth.

Boxborough is characterized by a mix of farms, newer subdivisions, limited commercial areas, and a significant amount of undeveloped land. Land within the watersheds to drinking water supplies must be protected to avoid contamination of the water supply. Water resources need to be protected from adverse land uses, while providing Boxborough residents with the ability to make reasonable use of their land. The primary generator of development pressure comes from Interstate 495 where there has been explosive commercial, office, and industrial development in the past decade as high-tech firms have relocated to this region of the state. The secondary impact of this commercial and office development is the construction of residential subdivisions with large, high-priced homes. Not only does this residential development consume open space, but it also creates a barrier to entry into the housing market. Town employees, school teachers, adult children of existing town residents and seniors often find that they cannot afford to live in the town.

Balancing the potentially conflicting objectives of resource protection and managed growth is an important goal of the master plan process. As the community experiences residential growth, there is an increasing demand for services such as gas stations and convenience shopping, and a growing need for public infrastructure and facilities such as schools and ball fields. These community needs must be planned for in an environmentally sensitive way. A professionally assisted master planning effort can help the town to identify the types and intensity of land uses acceptable in particular areas of town.

The chapters that follow provide greater detail about the history of Boxborough, its demographic change, the existing economic climate, and the town's natural resources. They describe the needs and the vision of the community as defined through a public process. This document summarizes recommendations for dealing with change in Boxborough; the action plan proposes regulatory change, as well as design standards and other tools for implementation. The preparation of this plan involved the expertise of

planners, engineers, landscape designers, environmental scientists, engineers, and attorneys.

While the resource protection has been at the backbone of this project, things will change, and Boxborough will need to be prepared for these changes. The role of the master plan is to be a living document that will help to guide the community in making responsible and future oriented land use decisions.

The many residents, local officials, and business people of Boxborough must be thanked for their endless commitment to the success of this plan. Those who gave their time through committee meetings and public workshops are greatly appreciated.

Boxborough Master Plan Steering Committee

- *Natalie Lashmit, Town Administrator*
- *Alicia Altieri, Town Planner*
- *Simon Bunyard, Board of Selectmen*
- *Les Fox, Board of Selectmen*
- *Jennie Rawski, Planning Board*
- *Mike Ashmore, Planning Board*
- *Owen Neville, Planning Board*
- *Karen Methany, Planning Board*
- *John Markiewicz, Planning Board*
- *Kathie Becker, Board of Appeals*
- *David Kembel, Board of Appeals*
- *Bryan Lynch, Board of Health*
- *Philip Alvarez, Board of Health*
- *Channing Wagg, Boxborough Housing Board*
- *Beverly Lessard, Boxborough Business Association*
- *Karen Kelly, Citizen at Large*
- *Cindy Markowitz, Citizen at Large*
- *Charlene Golden, Conservation Commission*
- *David Koonce, Conservation Commission*
- *Nancy Crowley, Council on Aging*
- *Daniel MacPhail, Economic Development Committee*
- *Jeffrey Fuhrer, Economic Development Committee*
- *Diane Kaulbach, Finance Committee*
- *Lorraine Carvalho, Finance Committee*
- *Scott Robinson, Historical Commission*
- *Greg Ross, Library Trustees*
- *Liz Markiewicz, School Committee*
- *Sue Reuther, Recreation Commission*

Beals and Thomas, Inc.

- *Susan M. Glazer, Project Director*
- *Marieke S. Armstrong, Environmental Planner and GIS Analyst*
- *Susan A. Lynch, Land Use Planner*

- *Nathaniel C. Brown, Economic Development Planner and GIS Analyst*
- *John E. Thomas, PWS, Environmental Oversight*

Brown & Brown, PC

- *Pamela J. Brown, Regulatory Consultant*

McMahon & Associates, Inc.

- *William Steffens, Transportation Project Director*
- *Gary McNaughton, Transportation Project Manager*

CHAPTER 1

A VISION FOR BOXBOROUGH

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A VISION FOR BOXBOROUGH

VALUED QUALITIES OF BOXBOROUGH

The vision of the people of Boxborough is the foundation of this Master plan. The small-town, family-oriented, excellent schools, rural atmosphere, safe neighborhoods, historic places, and scenic qualities are the key features that Boxborough residents believe contribute to the town's sense of place. Most residents are satisfied with the current municipal services such as schools, police, fire, and road maintenance. The greatest concerns that people have are the pace of development that results in the loss of open land, the future demand for town services, and the unknown impacts of Cisco Systems, Inc. and other large commercial developments on the town's development, schools, and public services.

The vision for the future of Boxborough has been expressed in a number of ways: through a community-wide survey in 2000, the Town Center Visioning Workshop, Master plan Steering Committee working sessions, and community workshops held on February 27, 2001, June 12, 2001, and October 9, 2001. Common threads that define the vision run through the comments in each of these efforts. Community character is described in both social and physical terms.

The size of the town is central to one of the core values - sense of community. There is a community spirit in Boxborough that is possible because of its small size. People connect to each other as they have in the past, through the elementary school, religious and social organizations, and involvement in town government. In many ways, this is how Boxborough has always been defined as a community. The community spirit is the glue that has held the town together.

Openness of the Landscape

Boxborough has been described as a rural community. When people are asked what they mean by that, they respond that the open expanse of land gives the town its rural feeling. These open parcels of land are often farms, but they are also uplands, forests and meadows, wetlands and water bodies. In recent years farmland has been developed for residential use. The loss of farmland not only takes away from the open land, it slowly erodes the town's agricultural character.

A major reason for the loss of open land is the pressure to develop the residentially-zoned land that predominates in Boxborough. This development has occurred in most of the communities in the I-495 area that has become the fastest growing region in the state. People have discovered the quiet, rural nature of Boxborough, its well-run government, and its good schools. Boxborough's population has increased 46% during the past decade and the number of households has increased by 28%. The concern for the future is that the location of Cisco Systems, Inc. off Swanson Road, with 3,000 new employees, will increase development pressure.

Retain the Character of Route 111

Massachusetts Avenue (Route 111) is the route from which Boxborough is most visible to the greatest number of people. It runs east-west through the middle of the town. It is also the only section of the town that is generally zoned for business uses. There are two small “strip malls” and a few isolated business uses, but otherwise, the road retains its rural character that is defined by the tree canopy and stone walls along the sides of the roadway. People do not want to see the area turned into a series of strip malls with businesses that are destinations in and of themselves. Boxborough's citizens prefer businesses owned by local residents that serve the local community and reflect the character of the town. They want small businesses, not “big box” stores that create traffic congestion.

Protect the Water Supply

Because Boxborough has no public water supply and no public sewer system, development in the community is closely tied to its natural resources. Each development must provide its own water supply and septic disposal system. Larger commercial developments must also ensure that there is enough water for fire protection. Because everyone is drawing from the same water sources, the Suasco and Beaver Brook watersheds, protection of the water supply is critical. It is not only the quantity of water that will be needed for the future, but the quality of that water as well.

Maintain High Quality Town Services

Although the beauty of the town's rural character and its quiet, safe neighborhoods may attract people to choose Boxborough as a place to live, it is the high quality of the town services and especially the school system that keeps residents there. Good schools are a primary attraction for potential residents, particularly as they compare towns in a given geographic area. The school system and town government have many professionals who continuously provide high quality services.

INTER-RELATIONSHIPS OF CORE VALUES

The inter-relationship of the elements of the vision for the future of Boxborough has been clarified for many people as part of the master plan process. If the open land is protected from development, fewer homes will be built and the demand for drinking water wells will be reduced. Development can be discouraged from areas that are sensitive to the quality of the water. By keeping businesses small and locally-oriented, the need to widen roadways to accommodate traffic is reduced. All of this does not mean that growth must stop, but that it must

be managed and planned. Each of the values that have been expressed have an impact on each of the master plan elements that will be discussed in subsequent sections of this document.

MASTER PLAN PROCESS

Defining the community vision is the first step in the master plan process. Data gathering provides a snapshot of Boxborough at the time the plan is being created. Looking at the plan element trends over time is also important to understanding the future of the town. The issue categories reflect the elements of a master plan that are established in Massachusetts General Laws Chapter 41, section 81D. Although this statute mandates that communities prepare a master plan, the law is not enforced due to the lack of an associated funding mechanism. Recent efforts by the state have resulted in Executive Order 418, which is designed to create Community Development Plans and encourage communities to provide more affordable housing. The Community Development Plans, however, are not comprehensive master plans; they lack consideration for public services and facilities, recreation, and fiscal planning. Fortunately, many communities such as Boxborough have realized that preparing a plan is important because it enables the creation of a process for a community to come together to examine critical issues that it may face and choose strategies to guide the future. Generally, the required elements of a comprehensive master plan include:

- *Goals and Policies:* An interactive public process to determine community values and goals, and to identify patterns of development that will be consistent with the goals.
- *Land Use:* Identifies present land uses and patterns and designates the desired distribution, location, and inter-relationships of public and private land uses.
- *Housing:* Identifies and analyzes existing and forecasted housing needs and objectives including programs for the improvement and development of housing.
- *Economic Development:* Identifies policies and strategies for the expansion or stabilization of the local economic base and the promotion of employment opportunities.
- *Natural and Cultural Resources:* Provides an inventory of the significant natural, cultural, and historical resource areas of the town, and policies and strategies for the protection and management of such areas.
- *Open Space and Recreation:* Provides an inventory of natural resources, recreation, and open space areas of the town, and develops policies for the management and protection of such resources and areas.
- *Public Services and Facilities:* Identifies and analyzes existing and forecasted needs for publicly-provided facilities and services. For Boxborough, this plan element is critical to addressing the educational needs of the town.

- *Circulation:* Provides an inventory of existing and proposed circulation and transportation systems, both vehicular and pedestrian. For Boxborough, which currently has no public sidewalks, this element has particular interest, given the creation of the Town Center district and the desire to create both a school and a library near Blanchard Memorial School.
- *Implementation:* The final step in the master plan process is the development of an implementation plan that defines and schedules the specific municipal actions necessary to achieve the objectives of each element of the master plan. A master plan does not serve the community well if it does not tell the community how to achieve its goals. The implementation plan takes the vision, develops both short-term and long-term goals and objectives from the vision, and integrates the goals and objectives with the plan elements. The outcome is a set of actions with priorities and assigned responsibilities.

Master Plan Steering Committee

The Master Plan Steering Committee was appointed by the Planning Board to represent a cross-section of boards and interest groups. In addition, several citizens at large were appointed. All of these dedicated volunteers were enthusiastic and constructive in their work on the committee. Without their dedication the plan would not have come together. Town Planner, Alicia Altieri, coordinated the committee's communication and meetings. She was the glue that held the committee together and served the community well with her attention to detail and enthusiastic spirit.

The following is a list of the Master Plan Steering Committee members:

Town Administrator	Natalie Lashmit
Town Planner	Alicia Altieri
Board of Selectmen	Simon Bunyard Les Fox
Planning Board	Jennie Rawski Mike Ashmore Owen Neville Karen Metheny John Markiewicz
Board of Appeals	Kathie Becker David Kembel
Board of Health	Bryan Lynch Philip Alvarez
Boxborough Housing Board	Channing Wagg
Boxborough Business Assn.	Beverly Lessard
Citizens at Large	Karen Kelly Cindy Markowitz
Conservation Commission	Charlene Golden David Koonce
Council on Aging	Nancy Crowley
Economic Development	Daniel MacPhail

Committee	Jeffrey Fuhrer
Finance Committee	Diane Kaulbach
	Lorraine Carvalho
Historical Commission	Scott Robinson
Library Trustees	Greg Ross
School Committee	Liz Markiewicz
Recreation Commission	Sue Reuther

Community Workshops

Community workshops were held in February, June, and October of 2001. Each of these events was advertised in the local newspaper, with posters located around town and flyers distributed to schoolchildren and at town events. The June workshop was also promoted at the 2001 Annual Town Meeting in May. The first workshop focused on what kind of vision townspeople sought for the community. In addition to responding to topical discussion questions in small groups, participants were asked to rank resource attributes as part of the resource sensitivity analysis. In the June workshop, residents discussed goals and objectives on four focused topics: land use/regulations, economic development, protecting open space, and housing. The October workshop focused on implementation options. Participants ranked each of the options. This ranking then became the basis for the implementation strategy.

CONCLUSION

The people of Boxborough have recognized that the Town of Boxborough will change, but are concerned because they want to manage that change. Their vision for the future is the foundation and guiding force of this master plan. The chapters that follow document what Boxborough has and what it needs as defined through the master plan process. Included in the chapters are recommendations to help the community reach its future vision, protecting the character that the residents cherish, and providing the services they need.

CHAPTER 2

A PICTURE OF BOXBOROUGH

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A PICTURE OF BOXBOROUGH

INTRODUCTION

Boxborough's current character reflects its early settlement patterns and its strong rural and agricultural ties. These development patterns have defined the manner in which growth has occurred throughout the town's history and are clearly evident in the character of Boxborough today. The desire to preserve the rural open space qualities of the town is still strong and will shape future growth.

AN HISTORICAL PERSPECTIVE

Introduction

In their book "Boxborough: A Portrait of a Town 1783-1983¹," the authors wrote, "A town's character is formed more by its people than by its statistics. Nevertheless, statistics do provide an objective standard by which to measure growth and change; without such a standard, any history would be incomplete." Boxborough's history has always been about its small size and large sense of community.

The town's active farms, expansive woodlands, and rural character are a direct reflection of its early settlement patterns. Since its incorporation over 200 years ago, these features have defined the community's quality of life. The following sections offer an historical summary of how Boxborough evolved.

¹ The history of Boxborough documented in the following sections draws from *Boxborough: A Portrait of a Town 1783-1983*, written by Katherine Talmadge, Elizabeth West, Janet Calhoun, and Susan DeStefano and published in 1983. A draft Historic Inventory Preliminary Report prepared by the Town of Boxborough Historical Commission was also used as source material for this summary.

History of Boxborough

Forming a Town

Boxborough was formed by taking parts of Stow, Littleton, and Harvard. The people living on the edges of these towns found it inconvenient to travel to their respective town center meetinghouses. Thus, they formed their own society and in 1775, they purchased and dragged the old Harvard meetinghouse to the top of what is now Middle Road. After being denied three times because of objections by the adjacent towns, their petition to form a new town was finally signed on February 24, 1783.

Farming and Business

In the early days of Boxborough, self-sufficient farming was the town's primary occupation with each family producing its own needs. Boxborough farmers raised many crops and, in the late 1800s to early 1900s, began transporting them to markets in Boston and Worcester. Evolving from their self-sufficiency, farmers of the 1900s grew many different crops, but later evolved into specialists. Apple growing and cattle grazing were prevalent in Boxborough during the early half of the twentieth century. The cattle could easily graze alongside the apple trees, which allowed the farmers to use their land twice. Gristmills, oil mills, and cider mills also sprung up around town as a result of flax, wheat, and apple farming.

The early businesses resulted from the farmers' needs and the resources of the land. Probably growing out of the farmers' need for storage barrels, cooper shops sprang up in Boxborough. Boxborough's abundant forests also gave rise to many sawmills. In 1860, Henry David Thoreau described one such 400-acre oak forest (Inches Woods) as "the most remarkable and memorable thing in Boxborough." Unfortunately, just a few years later, many of the grand oaks were cut down and sold as ship timber.

Boxborough has had little need for the abundance of retail commercial development prevalent in nearby Acton. Boxborough's first general store on record opened in 1806 at the north end of Middle Road. Boxborough was said to be without a store at all between 1875 and 1936, but peddlers and deliverymen seemed to fill the void. Through the years, a variety of other small businesses grew to serve local needs such as the Lawrence Tavern, Pop Moore's, Wetherbee Arms, Ma's Lunch, and the Wetherbee Garage. The Nashoba Valley Drive-in Theatre was built in 1952 and in the 1960s, several businesses sprang up in Boxborough including Boxboro Sheet Metal, B & F Exxon, and Norm Card Plumbing and Heating among others. The Sheraton (now Holiday Inn) opened its doors in 1975 along with Harry's Tavern and the Garden Court restaurant. Some townspeople worried about additional traffic and problems for the police from the Sheraton, but Boxborough was in need of business to broaden its tax base. In the mid-1980s, Nippon Electric Company (NEC) Information Systems chose Boxborough as its United States headquarters. Located on the southern side of

Massachusetts Avenue, NEC brought commercial uses and a broadened tax base to the town. The I-495 corridor continues to appeal to “high-tech” industry with Cisco Systems taking over the NEC buildings along Massachusetts Avenue and developing a second campus in the northwest corner of town along Beaver Brook and Swanson Roads. Nonetheless, Boxborough retains its “small-town” feel. Until 1972, house numbers were not necessary because “everyone knew everyone.”

Schools

In 1784, Boxborough was originally divided into four school districts, each with its own schoolhouse, and remained so until the middle of the 20th century. During this time, students traveled to Harvard, Littleton, Concord, or Maynard for high school. Later, most students went to Acton for high school. Near the end of the nineteenth century, the town twice voted down the consolidation of the four elementary schools, but in 1946 things changed when Arthur Blanchard donated the funds necessary to construct a consolidated elementary school. Blanchard Memorial School opened for all Boxborough elementary school children in September 1949. Boxborough regionalized with Acton High School in 1955 and Acton Junior High in 1956. The Minuteman Vocational Technical High School serves Boxborough and other area communities. In the mid-1990s, Blanchard Memorial School underwent a multimillion-dollar expansion and renovation to handle the increasing number of school-aged children in Boxborough. Blanchard Memorial School remains the only elementary school in Boxborough and the children still go on to the Acton-Boxborough regional schools for grades 7-12.

Transportation

In 1814, a turnpike, now known as Route 111, was opened between Harvard and Concord. This road was a privately operated toll road until the owner abandoned it. It was later declared a public highway in 1830. Even at that time however, most people in Boxborough traveled by foot or by horse. A train station was never located in Boxborough, though there was a flag stop on the tracks where the Fitchburg railroad ran through the northeast corner of town. In 1900, trolley service came to Boxborough joining South Acton to Maynard and in 1908, South Acton to West Acton. Lowell, Acton, & Maynard Street Railway Company originally intended to run the trolley all the way from Maynard to Lowell, but the tracks never expanded to Lowell as planned. Automobiles were first brought to town in the 1920s, but even as late as the 1950s were a rare sight in town.

Although Interstate 495 was officially opened in 1964, Boxborough was affected long before. The highway cut through people’s lands, forcing them to move and making some parts of the town inaccessible.

Relying on People

Boxborough has always been a place where people rely on each other for help, social activities, and participation in government. For example, Boxborough had a volunteer fire department until 1941 when the department was officially

established and a special telephone line was installed to assist communication. Volunteers built the firehouse in 1957-1959, a building that is still used today. Until 1972, volunteers handled police duties. The building of the library was also a test of individual and community spirit. In the 1800s, books were often housed in the living rooms of caring townspeople and were circulated among the residents. It was not until 1908 that the library had a permanent home at Library Hall. However, on January 9, 1953, in the middle of a three-day snowstorm, the library burned. The library did not have another permanent home until January 1966 when the library building opened at the Middle Road location. In the intervening years, many dedicated residents donated books and money and time to keep the library open.

It is the quiet rural character of the town that has attracted people to Boxborough over the years. The farms, forests, and winding roads all form a sense of a small country town. It is the people and the sense of community however, that keeps people in the town and makes them want to plant roots in Boxborough. Although Boxborough may have changed physically over time, its sense of community has remained strong.

WHO WE ARE TODAY AND WHERE WE ARE HEADED

A snapshot of current population characteristics of the town will help to identify factors that are likely to influence the changing social and economic make-up of Boxborough. Furthermore, an evaluation of population growth trends will help the town plan services it may be asked to provide to meet future demands and needs.

DEMOGRAPHICS

Most of the following demographic data are based on the 2000 U.S. Census. However, where the 2000 census data was not available, 1990 census data was used and has been noted. Population projections were based on extrapolated 1990 census figures. More recently, the Massachusetts Executive Office of Environmental Affairs has performed build-out analyses for all communities in the state. Although the analysis for Boxborough uses current population projection techniques, the numbers are still projections, not data.

Boxborough contains 10.39 square miles of land and is a small community compared to the surrounding towns - about half the size of Acton, Stow, and Littleton, and even smaller when compared to Harvard. In terms of population density however, Boxborough is denser than Stow and significantly less dense than Acton.

Table 2-1: Comparison of Density for Boxborough and Surrounding Towns

Town	Area in square miles	2000 Population	Density (pop./sq.mi.)
Massachusetts	8,257	6,349,097	769
Acton	20.29	20,331	1,002
Boxborough	10.39	4,868	469
Harvard	26.97	5,981	222
Littleton	17.55	8,184	466
Stow	18.09	5,902	326

Source: Mass DHCD Community Profiles and 2000 U.S. Census

Boxborough's population grew rapidly (110%) between 1970 and 1980, from 1,468 to 3,126. There was another growth spurt in the past decade from 3,343 in 1990 to an estimated 4,868 in 2000 (46%). This is a much faster rate than surrounding communities as indicated in Table 2-2. Table 2-3 projects that Boxborough's accelerated rate of change will continue.

Table 2-2: Comparison of Population Changes in Boxborough and Surrounding Towns

Town	1930	1940	1950	1960	1970	1980	1990	2000	1970-2000
Acton	2,483	2,701	3,510	7,238	14,770	17,544	17,872	20,331	37.7%
Boxborough	312	376	439	744	1,488	3,126	3,343	4,868	227.0%
Harvard	987	1,790	3,983	2,563	13,426	12,170	12,329	5,981	*
Littleton	1,447	1,651	2,349	5,109	6,380	6,970	7,051	8,184	28.3%
Stow	1,142	1,243	1,700	2,573	3,984	5,121	5,328	5,902	48.1%

*Harvard's population included Fort Devens that closed in the early 1990s.

Source: U.S. Census

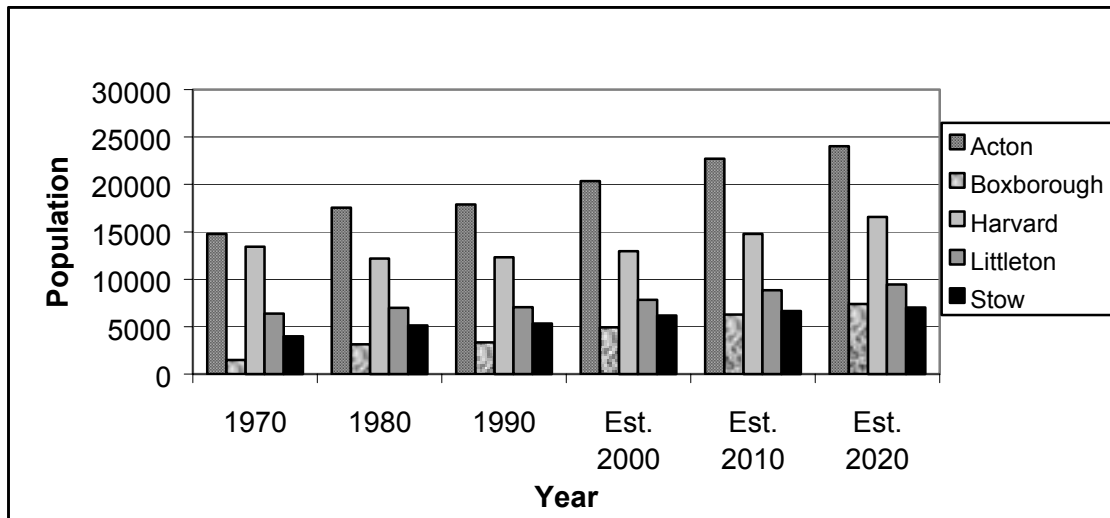
The chart below compares population projections in Boxborough to the towns that surround it. In every decade since 1970, Boxborough has grown at a faster rate than surrounding communities. While rates of growth may be high, the actual numbers are relatively small. During the past decade Boxborough has grown faster than all but six communities in the state. Boxborough has also been growing significantly faster than the communities that surround it since 1970.

Table 2-3: Comparison of Population Trends and Projections

Town	1970	1980	% change 1970-80	1990	% change 1980-1990	2000	% change 1990-2000	Est. 2010	% change 2000-2010	Est. 2020	% change 2010-2020
Acton	14770	17544	18.78%	17872	1.87%	20331	13.76%	22704	11.85%	24017	5.78%
Boxborough	1488	3126	110.08%	3343	6.94%	4868	45.62%	6285	29.10%	7397	17.69%
Harvard*	13426	12170	-9.35%	12329	1.31%	5981	-48.5%	NA	NA	NA	NA
Littleton	6380	6970	9.25%	7051	1.16%	8184	16.06%	8854	8.19%	9438	6.60%
Stow	3984	5121	28.54%	5328	4.04%	5902	10.77%	6662	12.88%	7022	5.40%

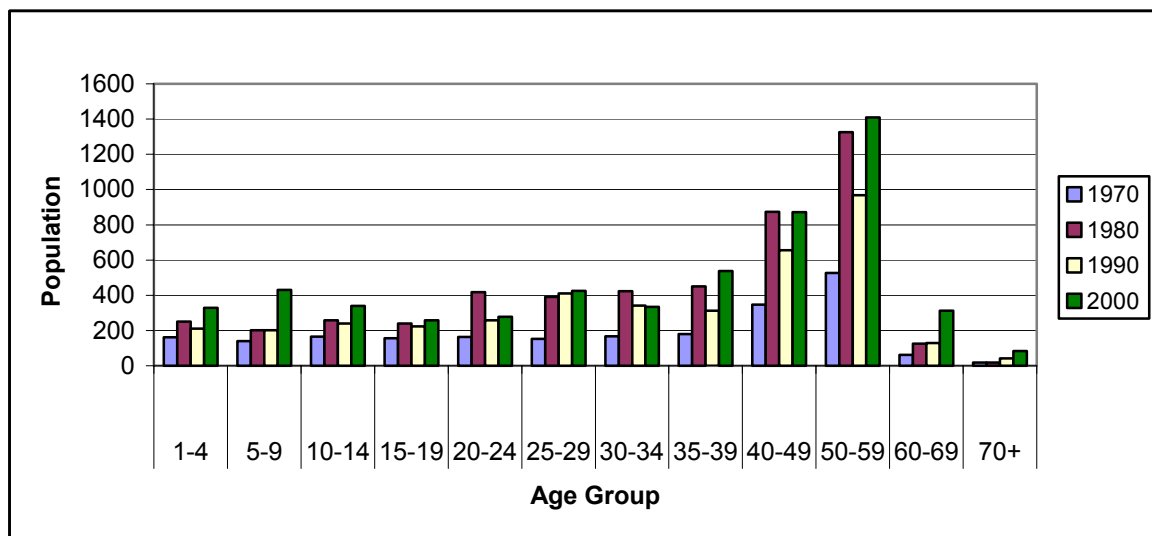
Source: U.S. Census and estimates from Metropolitan Area Planning Council

- Harvard's 2000 population reflects the closing of Fort Devens.

Figuer 2-1: Projected Population Growth

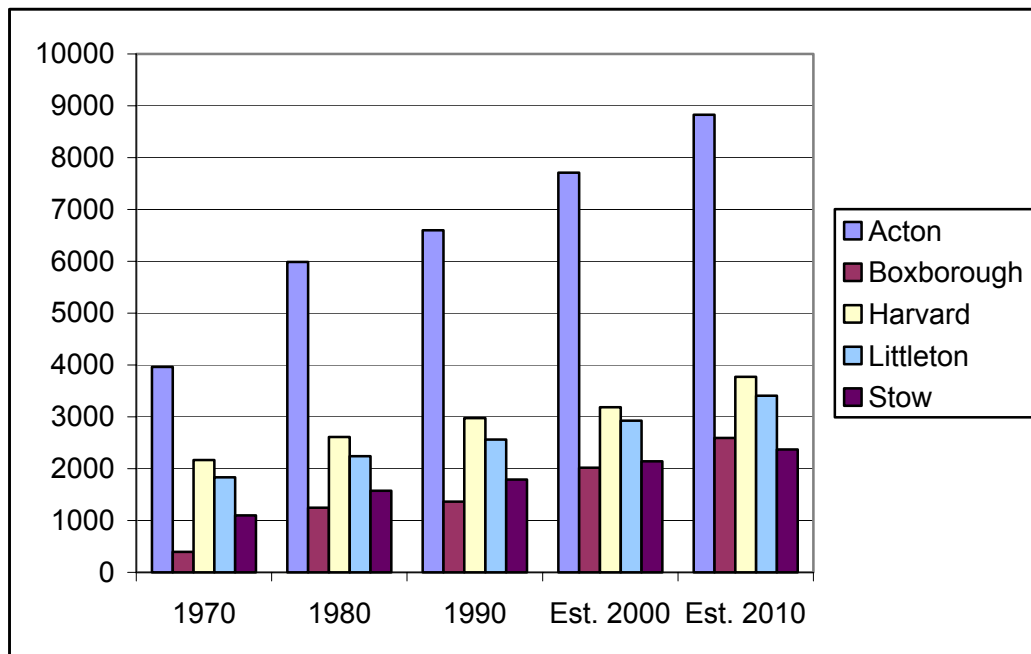
Source: Metropolitan Area Planning Council

The preceding tables and figures are useful to illustrate the evolving overall population characteristics of Boxborough. However, an assessment of age characteristics is necessary to appreciate the policy implications of population changes over time. For example, how large is the school-aged population in the town and how is it expected to change? A comparison of Boxborough to the surrounding communities is also helpful to provide some context for the population data presented above.

Figure 2-2: Boxborough Population by Age Group 1970-2000

Source: Metropolitan Area Planning Council and Massachusetts Institute for Social and Economic Research

In terms of the number of households in Boxborough, the rate of growth has also outpaced the surrounding communities and is expected to continue in the future.

Figure 2-3: Household Projections

Source: Metropolitan Area Planning Council

Trends in Household Formation

Boxborough has also formed households on average at a faster rate than the surrounding towns. From 1970 to 1980, the number of households increased by 214%. This is reflective of the apartment and condominium development that occurred during that decade, when approximately 770 units were constructed. The pace of development slowed during the 1980s, but increased significantly (46%) during the 1990s. This rate of household formation was more than twice that of the surrounding towns. Boxborough is expected to continue to grow at least twice the rate of surrounding towns. While Boxborough has approximately 1900 households, it is expected to add another 700 households over the next 20 years.

While the number of households has been increasing, so has the number of persons per household; according to the 2000 U.S. Census, it was 2.56 persons per household for all vacant and occupied households (2.63 per occupied household). There was a significant change in the number of persons per household in the 1970s when many apartment and condominium units were built. In 1970, household size was 3.75; in 1980, it was 2.51 and in 1990, 2.25. The 2000 U.S. Census broke the household size into owner and renter occupied units. The renter-occupied units had 1.84 people per household, while the owner-occupied units had 2.95 people per household.

A more detailed review of household formation reveals some interesting trends. What has been occurring in Boxborough in the past decade differs dramatically from previous periods.

1. Adult age groups, particularly 50-59 and 60-69 age groups, grew at fast rates.

2. The 50-59 year olds in the 1990s were 30-39 year olds two decades ago. That group was the fastest growing age group then as well.
3. Town records indicate that the 20-29 year age group has decreased by more than 40% in the past decade while MAPC and MISER estimated small increases in this age group. This is surprising since only two decades ago this age group was the second fastest growing age group. Nevertheless, the decrease in the numbers of 20-29 year olds can be explained. Many people in their early twenties go away to college or enter the job market elsewhere and then find that coming back to Boxborough is expensive. The rising cost of housing is a barrier to entry or re-entry in the case of those who grew up in the town for the 20-29 year age group.

As important as the change in age groups is the change in household formation patterns. In general, people moving to new housing in Boxborough are families whose heads of households are in their 40s and are rearing school-aged children. This is borne out by an analysis of new subdivisions. While the number of people per household increased from 2.25 in 1990 to 2.63 in 2000, in new subdivisions built since 1990 the number of people per household was 3.96, 40% higher than the town average, as estimated by the master plan consultants. The average family size in 2000 was 3.25. The range of density in these subdivisions was 2.33 to 4.71 people per household. In most cases, there are more children in the new larger homes, and in some cases there are extended families. In the condominium complexes that had children (excluding senior housing) the number of persons per household in 2000 was 1.41. The number of children in these units was 0.18 whereas in single-family houses the number of children per household was an estimated 1.18.

Given the pattern of household formation and the number of new single-family homes being built each year, which has slowed to an average of 21 in the past three years from a high of 81 in 1993, by 2010 the number of residents would reach 5,735 and the number of dwelling units would be 2,121. This population projection is less than the MAPC projection of 6,285 new residents and the MISER projection of 6,186. These projections have significance for town services and facilities that will be discussed.

Population Projections

Understanding population characteristics and trends is an important part of the planning process since the total population and rate of growth impact housing, land, municipal services, and the social and economic make-up of the town. Population characteristics are the basis for establishing projections of what Boxborough is expected to look like in the future. This information is useful for town officials to plan for the provision of efficient community services to meet future demands and needs. It is also useful for town residents in determining what kind of community they want for the future. Although initial 2000 U.S. Census have been released and have been used throughout this document, estimates of population were based on 1990 U.S. Census and therefore, are illustrative rather than absolute.

MAPC, MISER, and the Massachusetts Executive Office of Environmental Affairs (EOEA) have projected Boxborough's population using different methodologies. The

Boxborough Town Planner has also projected population using a more refined parcel-based analysis. Table 2-3 shows the differences in the population projections by source. Each agency uses a different timeline as to when build-out may occur.

Table 2-3: Comparison of Build-out Estimates for Boxborough

	TOWN	MAPC	MISER	EOEA
1950	439	N/A	N/A	N/A
1960	744	N/A	N/A	N/A
1970	1,451	N/A	N/A	N/A
1980	3,126	N/A	N/A	N/A
1990	3,343	N/A	N/A	N/A
2000	4,884	4,926	4,978	4,893
2005	N/A	N/A	5,554	5,554
2010	N/A	6,285	6,186	6,186
2020	N/A	7,397	N/A	6,935
Build-out	6,650	7,400	7,000	7,000

Sources: Metropolitan Area Planning Council
 Massachusetts Institute for Social and Economic Research
 Executive Office of Environmental Affairs
 Boxborough Town Planner

Regardless of the population projection used, the accelerated rate of growth is anticipated to continue into the future. Thus, Boxborough must plan now to manage and guide this growth.

CHAPTER 3 LAND USE

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LAND USE

INTRODUCTION

Boxborough is a rural residential town located in what has become the fastest growing part of the state, the I-495 corridor. In the past ten years alone, the population of the town has grown by over 45% and the number of new home permits has increased by 30%. The history of Boxborough's land use over time (Chapter 2) is helpful in understanding the future land use given present market influences and the needs of current and future residents.

GOALS AND OBJECTIVES

Goal	Anticipate pressure to develop by managing growth.
Objective	Assure that development does not exceed the capacity of infrastructure systems and public services and facilities.

Goal	Preserve the elements of Boxborough that contribute to the town's rural residential character with strong agricultural and historical roots.
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Objective	New growth should be consistent with the town character by maintaining its rural and historical elements.
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Objective	Encourage the defined development of the Town Center to promote a sense of community and to encourage business development where it can best be accommodated.
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Objective	Establish a policy for agricultural preservation.
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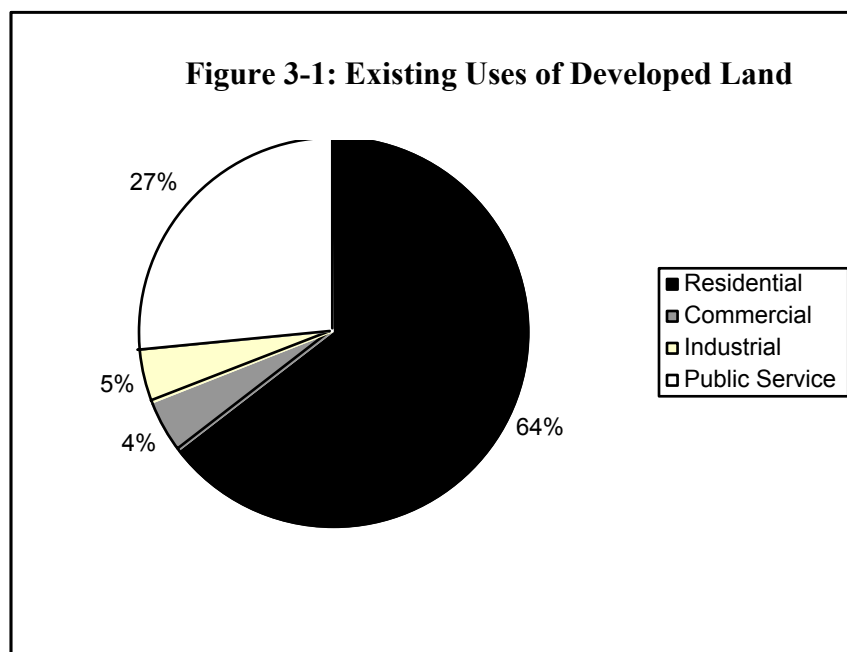
Goal	Balance economic development with community character.
Objective	Encourage economic development only along Routes 111 and the area west of I-495.

Goal	Protect open land and encourage residential development where it is most appropriate.
Objective	Use the natural features of the land as a guide to where residential development should occur.
Objective	Consider alternative forms of housing such as townhouses or accessory units that are designed to be consistent with town character.
Goal	Balance the tax base between residential and non-residential development so that the tax burden can be shared.
Objective	Avoid overburdening the residential tax base.

ANALYSIS

Existing Land Uses

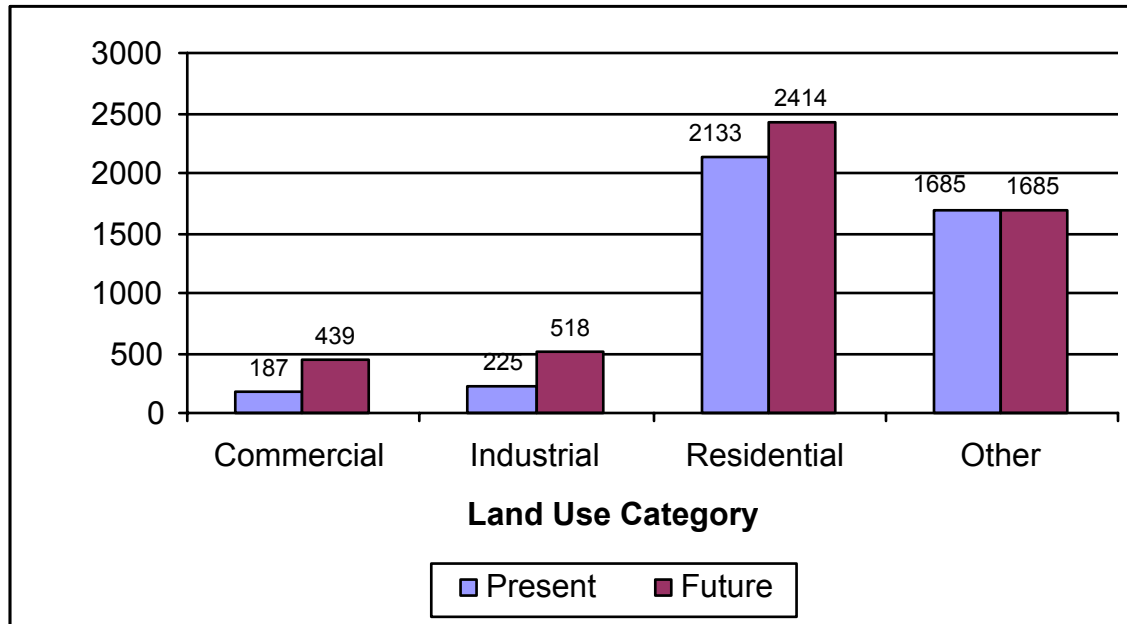
While most of Boxborough's residents might think of the town as only partially developed with an abundance of open land, they might be surprised to learn how much of the land in the town is considered developed, according to the Boxborough Assessing Department. The Assessor's information shows any lot containing a building as developed and does not consider that some lots contain ample amounts of open space. According to this definition, land developed for residential, commercial and industrial uses in Boxborough represents just about half of the land in Boxborough. Most of the developed land is residential.



Source: Boxborough Assessor's Department

Of the remaining developable land, approximately 34% is zoned residential, 30% is commercial, and 35% is industrial. The chart below shows the present, or developed land, in comparison to the future, or developable land, in each category. The “Other” category includes open space, public service and recreation land.

Figure 3-2: Present and Future Land Use



Source: Boxborough Assessor's Department

Recent Growth

Construction of new homes has increased dramatically in the 1990s with the approval of a record number of new subdivisions. Figure 3-3 illustrates the location of new subdivisions approved from 1985 to 2001. Construction of new homes has occurred at varying rates over the last decade. Although the number of building permits has slowed in the past four years, the early 1990's saw as many as 81 permits (in 1993) in one year. While the average number of building permits issued over the last four years is 19, the average over the last decade is approximately 40 permits. The smaller number of building permits reflects a smaller number of subdivision approvals in recent years. The following table shows new home construction from 1990 to 2001.

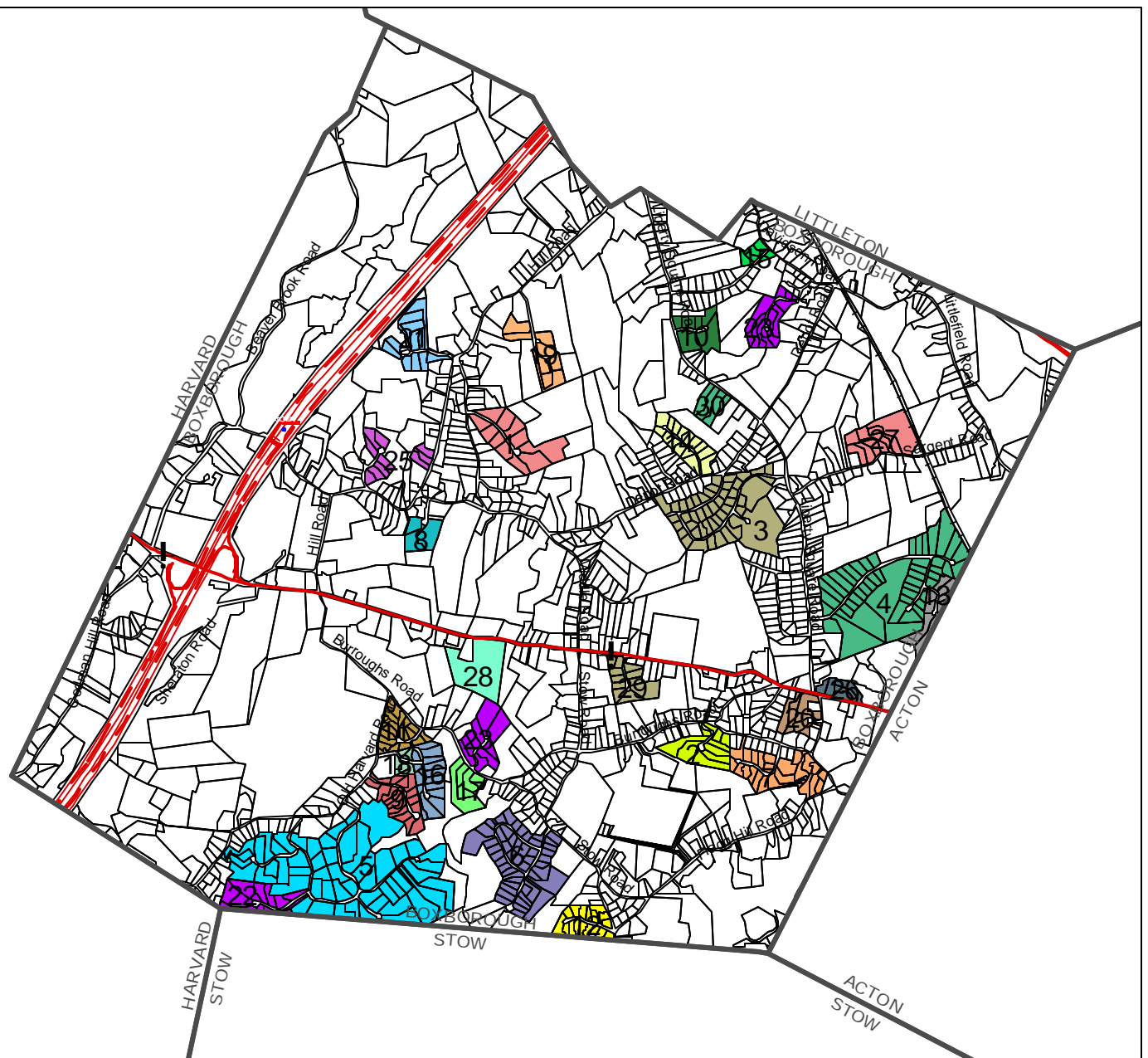
Table 3-1: New Single Family Building Permits by Year

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
No. of permits	29	43	79	81	52	22	35	42	18	25	20	13

Source: Boxborough Building Department

Land Use Issues

Most of the land use issues in Boxborough are a reflection of recent and anticipated growth in the town. The population of the town grew by almost 46% between 1990 and



ID	Name	Lots	Year Approved	Acres
1	Silbury Hills Estates	11	1988	40.49
2	Pine Burroughs Homes	8	1989	20
3	Liberty Tree Acres	54	1989	86
4	Reed Farm II	48	1989	142.32
5	Old Harvard Estates	49	1986	188
6	Heath Hen Meadows	50	1987	108
7	Deck House	23	1988	22.18
8	Darrowby Chase	3	1990	16.7
9	Sylvan Springs	18	1990	40.39
10	Starco	7	1991	53
11	Sylvan Woods	18	1992	18.43
12	Fifer's Grove	17	1992	18.36
13	Reed Farm 2	8	1992	16
14	Baldwin Hills	16	1993	19.62
15	Nashoba Drive	5	1994	6.48
16	Flerra Estates 2	14	1995	61.24

ID	Name	Lots	Year Approved	Acres
17	Flerra Estates 1	5	1995	14
18	Coach Road Estates	5	1995	10.3
19	Steele Farm	8	1996	38.5
20	Pine Pasture Run	5	1996	10.41
21	School House Lane	11	1997	22.7
22	The Heights at Houghton	11	1997	21.4
23	Colonial Ridge	7	1999	39.2
24	Priest Hill Estates	8	1999	17.42
25	High Pastures	8	1999	41.5
25	High Pastures	3	1999	4.5
26	Green Acres	5	1999	12.09
27	Kanniard	7	2000	26.53
28	Tanager Estates	8		27.69
29	Boxborough Meadows	48	2001	18
30	Howe Land	4	2001	10.49

Legend

- Roads
- US/State Route
- Interstate
- Railroad
- Parcel Boundaries

0.5 0 0.5 1 1.5 2 Miles

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Subdivision Activity 1985-2001

Source: MassGIS, Town of Boxborough
January 9, 2002
BTI Project No. W-1609

Figure 3-3
Boxborough, MA

2000. This is the largest increase in population of any decade both in numbers of Boxborough residents and percent of increase. (See Chapter II, A Picture of Boxborough.) While many communities welcome the economic development and the tax revenue it brings, these communities also experience growth pressures on both their infrastructure and governmental service systems, as well as pressure to develop open land for new employees of the businesses that have been attracted to the area. Boxborough's population increase is an indicator of the development pressure even before the construction of the Cisco Systems corporate campus in the town. Cisco Systems is now constructing 900,000 square feet of new office/research and development space, more than doubling the commercial square footage in the town, and recently (Nov. 2001) received its first approval for an additional 500,000 square feet. With all of these changes, preservation of the town's rural community character becomes paramount.

Regional Growth

The I-495 communities showed the greatest increases in population and land consumption. Information from the Metropolitan Area Planning Council (MAPC) indicates that over 22,000 acres of land were consumed between 1991 and 1999 in the MAPC region. In 1999 however, 57% of the region's land remained undeveloped, but is being developed at a rate of 7.6 acres per day. Some of the undeveloped land is permanently protected open space, but the majority is not. About 38% of this unprotected land is forestland that is being replaced by single-family housing. The following maps from the MAPC demonstrate the region's trends:

Figure 3-4: Regional Population Growth 1990-2000

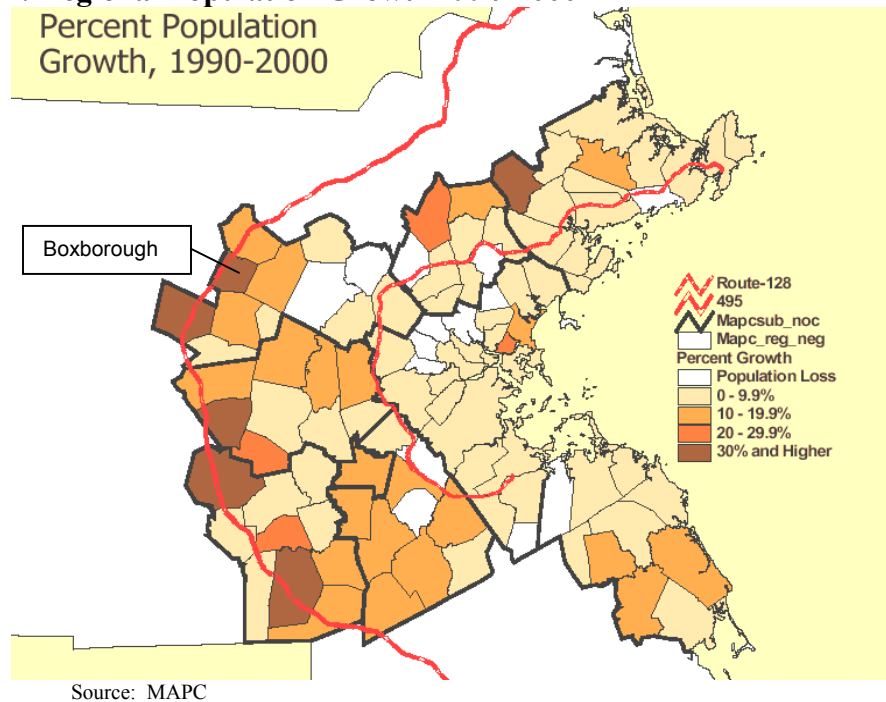
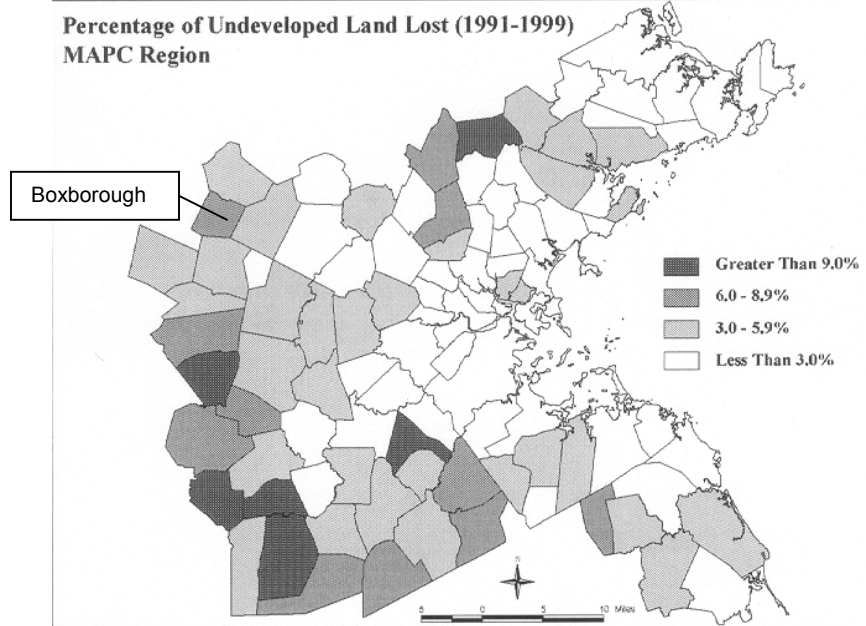


Figure 3-5 Regional Loss of Undeveloped Land

Source: MAPC

BUILD-OUT ANALYSIS

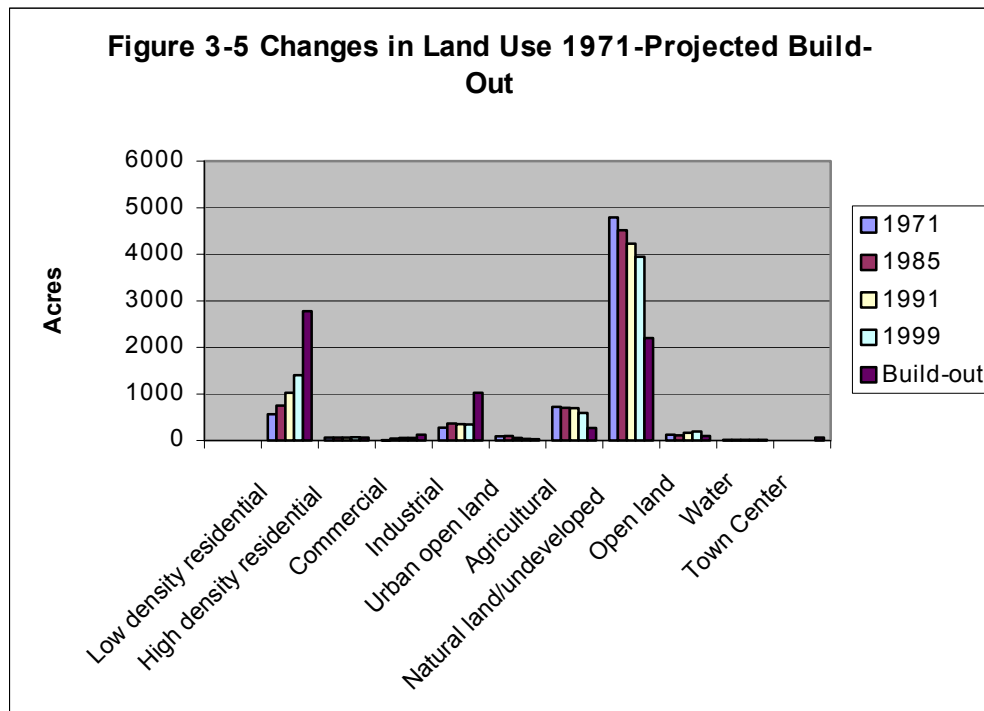
Like many small communities that are experiencing new growth, Boxborough is asking what the community might look like in the future, if development were to continue under existing zoning. A build-out analysis was prepared to provide a snapshot of what Boxborough might look like in ten years and in the future, if fully "built out." This analysis presumes that all buildable land would ultimately be developed without consideration of ownership or development restrictions. Assumptions about environmental constraints are described in the analysis. This snapshot enables discussion of how to achieve a more desirable future land use pattern. This section describes potential development in a ten-year timeframe and at future build-out. The method for identifying land to be included in the analysis, the assumptions made, and the factors considered are summarized below.

Existing Information

Two analyses have been performed to estimate what Boxborough might look like in the future with current zoning. These analyses vary according to their assumptions and data: one performed by the Massachusetts Executive Office of Environmental Affairs (EOEA), and one by the Town Planner. Because the EOEA determined developed and undeveloped land by aerial photographs, its analysis resulted in different numbers than the Town Planner's analysis that was parcel specific. The EOEA analysis was used to look at future land use characteristics and the Town Planner's build-out analysis was used to look at the ten year and future build-out scenarios since it was based on more detailed information.

Land Use Trends

While land use in the region has been changing, so too have land use patterns in Boxborough. From 1971-1999, according to figures provided by the Massachusetts Executive Office of Environmental Affairs, the number of acres in Boxborough devoted to low density (single family) residential use has increased from approximately 560 acres to 1,280 acres, an increase of almost 130%, while the amount of open land decreased from approximately 5,000 acres to 4,170 acres, a decrease of approximately 16.5%. It is estimated that at build-out, another 1,375 acres will be devoted to residential development and another 2,325 acres of open land will be lost to development. Figure 3-5 shows the percentage changes in land use. What is important is not the exact numbers, but the trends.



Source: Mass. EOEA

EOEA Definition: Urban open = parks, cemeteries, public and institutional spaces.

EOEA Definition: Open land = abandoned agriculture, power lines and areas with no vegetation

Build-out Scenarios

The following describes the current land use scenario, the ten-year scenario and potential future build-out. To summarize each snapshot, the amount of potential development is presented.

Current Land Use

The following table is a description of the current land uses in Boxborough using Assessor's data. This information is helpful to show how the town's land uses and amount of development may change in the next ten years and in the future. Presently, about half of Boxborough is developed.

Table 3-2: Current Land Use Residential and Industrial /Commercial Developed Land in Boxborough

		Acreage	% of Total Land
Total Developed Land		3,097 A.	47
Residential	1,906 units	2,702 A.	41
Industrial/Commercial	1,446,040 sf.	400 A.	6
Total Undeveloped Land		3,500 A.	53

Source: 2001 Assessor's Data supplemented by Town Planner.

2010 – 10 Year Build-out

The ten year build-out was estimated according to the trends in both Residential and Industrial /Commercial development in Boxborough from 1990-2000. Table 3-3 estimates the amount of development that could take place in Boxborough, in the next ten years.

Residential Assumptions

The housing section of this report (Chapter 4) analyzes housing trends and concludes that an estimated 250 new single-family units could be added to Boxborough from 2000 to 2010 assuming 25 new units/year and 60,000 square foot minimum lot size. These new units could be located on 344 acres exclusive of land needed for new roads. Although the 1990-2000 trend is closer to 40 new units per year, the recent trend is closer to 25 per year that was used in this analysis.

Industrial/Commercial Assumptions

From 1990 to 2000, the Planning Board approved Site Plans for approximately 570,000 square feet of new Industrial and Commercial development in Boxborough. Using the same rate of development, there could be an additional 570,000 square feet of new Industrial and Commercial development in Boxborough between 2000 and 2010. Assuming a Floor Area Ratio (FAR – See Glossary for definition.) of 0.1, the 570,000 square feet of new development could be located on approximately 130 acres of land. It is also assumed in this case that the 1.4 million square feet of the Cisco development has been constructed for a total of 1,970,000 square feet of new industrial and commercial development on 396 acres.

Table 3-3: 10 Year Build-out Scenario

		Acreage	% of Total Land
Total Developed Land		3,855A.	58
Residential	2,156 units	3,046 A.	46
Industrial/commercial	3,416,040 sf.	809 A.	12
Total Undeveloped Land		2,800 A.	42

Using these assumptions, the amount of developed land will increase, potentially, from 50 to 58% in ten years. Residential land may increase from 40 to 46% and Industrial/Commercial land may increase also by about 6%.

Future Build-out

The Boxborough Town Planner's analysis of the potential number of new developed acres at Build-out could be 1,438 acres of Land zoned Residential and 1,053 acres of land zoned Industrial/Commercial. The total number of new residential units could be 700 and the total square footage of new Industrial/Commercial development could be 4,232,832 square feet. These estimates were added to the existing conditions information to determine the build-out scenario.

Table 3-4: Potential Future Residential and Commercial Development

		Acreage²	% of Total Area
Total Developed Area		5,748 A.	86
Residential	2,606 units	4,410 A.	66
Industrial/commercial	5,678,872 sf.	1,338	20
Total Undeveloped Area		908 A.	14

This build-out indicates that 86% of the land in Boxborough could ultimately be developed. The amount of land for Residential development would increase from 40% to 66%, and the amount of Commercial/Industrial development would change from 12% to 20%. The following table describes the potential development in Boxborough, over time:

² The developed acreage at buildout may vary slightly between the two analyses. These analyses vary according to their assumptions and data: one performed by the Massachusetts Executive Office of Environmental Affairs (EOEA), and one by the Town Planner. Because the EOEA determined developed and undeveloped land by aerial photographs, its analysis resulted in different numbers than the Town Planner's analysis that was parcel specific.

Table 3-5: Boxborough Build-out Comparison

	Residential Units	Industrial/ Commercial Square Footage	Developed Land Area	Residential % of Total Land Area	Industrial/ Commercial % of Total Land Area	% of Total Land Area
Present	1,906	1,446,040	3,097	41	6	47
10-Year	2,156	3,416,040	3,855	46	12	58
Build-out	2,606	4,235,127	5,748	66	20	86

Estimated Date of Build-Out

This section attempts to apply trending information to determine the potential date of build-out. The differences in the rate of development over the past five and ten years are significant. There will be, therefore, two sections, one using the 1995-2000 trends and, one using the 1990-2000 trends.

*Using 1990-2000 Trends*Residential

Using the trending information from 1990-2000, at a rate of 400 new residences every ten years, Boxborough could be built out in terms of Residences within the next 15-20 years.

Industrial

Depending on whether the 1,400,000 square foot Cisco development is included as a trend, Boxborough's Industrial and Commercial land could reach build-out at different times.

- If the large Cisco development is included, and Boxborough has 1,970,000 square feet of new commercial or industrial construction every ten years, build-out could occur within 20 years. It should be noted that the Cisco Systems development site is unique in its size. No other site in Boxborough would support a development as large as Cisco's, so it is unlikely that build out could occur within 20 years.
- If the Cisco development is not included, the rate of development could be 570,000 square feet of new commercial or industrial every ten years. At this rate, the town would not be build-out in terms of Industrial and Commercial land for 50 years.

*Using 1995-2000 Trends*Residential

If housing trends continue according to the 1995-2000 trends at a rate of 250 new residences every ten years, Boxborough could be build-out in terms of Residences within the next 25-30 years.

Industrial

From 1995 to 2000 there have been 540,000 square feet permitted in Boxborough, the majority of the new Industrial/Commercial square footage over the past ten years. Using these past five years, instead, as a trend, the increase in square footage for the next ten years could be 1,080,000.

Depending on whether the Cisco 1,400,000 square foot development is added to the trending data, Boxborough's Industrial and Commercial land could reach build-out at different times.

- If the large Cisco development is included, and Boxborough has 1,980,000 square feet of new commercial or industrial construction every ten years, build-out could occur within 15 years.
- If the rate of development continues at a pace that does not include the Cisco development, or 1,080,000 square feet of new commercial or industrial every ten years, the town would not be built out in terms of Industrial and Commercial land within the next 25 to 30 years.

Each build-out analysis and population projection has a different associated cost of community services, as indicated in Table 3-6. Chapter VIII discusses public services and facilities in greater detail. The most significant difference is the projected number of school-aged children. The method and data used by different agencies to determine buildout result in slightly different projections. This points to the need for close monitoring of the school age population. The U.S. Census has not yet released a detailed age breakdown for the 2000 census; it is expected in 2002. Those figures may give guidance as to which projection is more accurate.

Table 3-6 Comparison of Cost of Community Services at Build-Out

	Existing	Town	MAPC	EOEA
Population	4,868	6,949	7,397	6,935
Households	1,931*	2,832	2,670	2,935
School-Age Children	1,090	2,180	2,056	1,394
Elementary Children	631	1,014	1,193	808
Solid Waste Usage (tons)	183	261	277	260
Water Usage (gal.)	365,100	521,175	554,775	518,250

* Reflects a 2001 estimate of households.

CONCLUSION AND RECOMMENDATIONS

How Boxborough manages its land will determine what the town will look like in the future. There are residents who strongly desire to maintain the rural character of the town. This desire often translates into the retention of open space, historic houses and stone walls. There are other concerns about balancing the residential with the Industrial/Commercial tax revenues and with the needs for affordable housing, recreation

land, and public facilities. The battle for open land does not have to be an all or nothing situation. The town can be creative with its regulations and also encourage the use of existing regulations, such as the Open Space Commercial Development. It can permit partial development so that development can occur alongside preserved open land. The town can develop design guidelines for preserving historic structures, altering stonewalls, and creating new businesses that are consistent with town character. The town can also develop new policies for agricultural preservation and the deed restriction of open forestland and wetlands where appropriate. In short, the town can encourage land development where it is appropriate and discourage development that it determines that it is not appropriate. The town can begin by fostering a positive working relationship with the people who want to develop their land through clear guidelines and an efficient permitting process. Bren Schrieber has placed a Conservation Restriction on 60± acres of land at 80/90 Central Street. The Cisco development will protect 242 acres of significant resource land in perpetuity through the Open Space Commercial Development Special Permit. These and other recommendations are detailed in Chapter XI: Acting on the Vision.



Legend

1971 Land Use

- low density residential
- high density residential
- commercial
- industrial/trans./mining
- urban open/recreation
- agriculture
- natural land
- open land
- water

2000 0 2000 4000 Feet



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mailto:bt@btweb.com
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1971 Land Use

Source: MassGIS, Town of Boxborough
June 1, 2001
BTI Project No. W-1609.00

FIGURE 3-7
Boxborough, MA

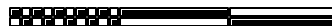


Legend

1985 Land Use

- low density residential
- high density residential
- commercial
- industrial/trans./mining
- urban open/recreation
- agriculture
- open land
- water

2000 0 2000 4000 Feet



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1985 Land Use

Source: MassGIS, Town of Boxborough
June 1, 2001
BTI Project No. W-1609.00

FIGURE 3-8
Boxborough, MA



Legend

1991 Land Use

- low density residential
- high density residential
- commercial
- industrial/trans./mining
- urban open/recreation
- agriculture
- natural land
- open land
- water

2000 0 2000 4000 Feet



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1991 Land Use

Source: MassGIS, Town of Boxborough
June 1, 2001
BTI Project No. W-1609.00

FIGURE 3-9
Boxborough, MA



Legend

1999 Land Use

- low density residential
- high density residential
- commercial
- industrial/trans./mining
- urban open/recreation
- agriculture
- natural land
- open land
- water

2000 0 2000 4000 Feet



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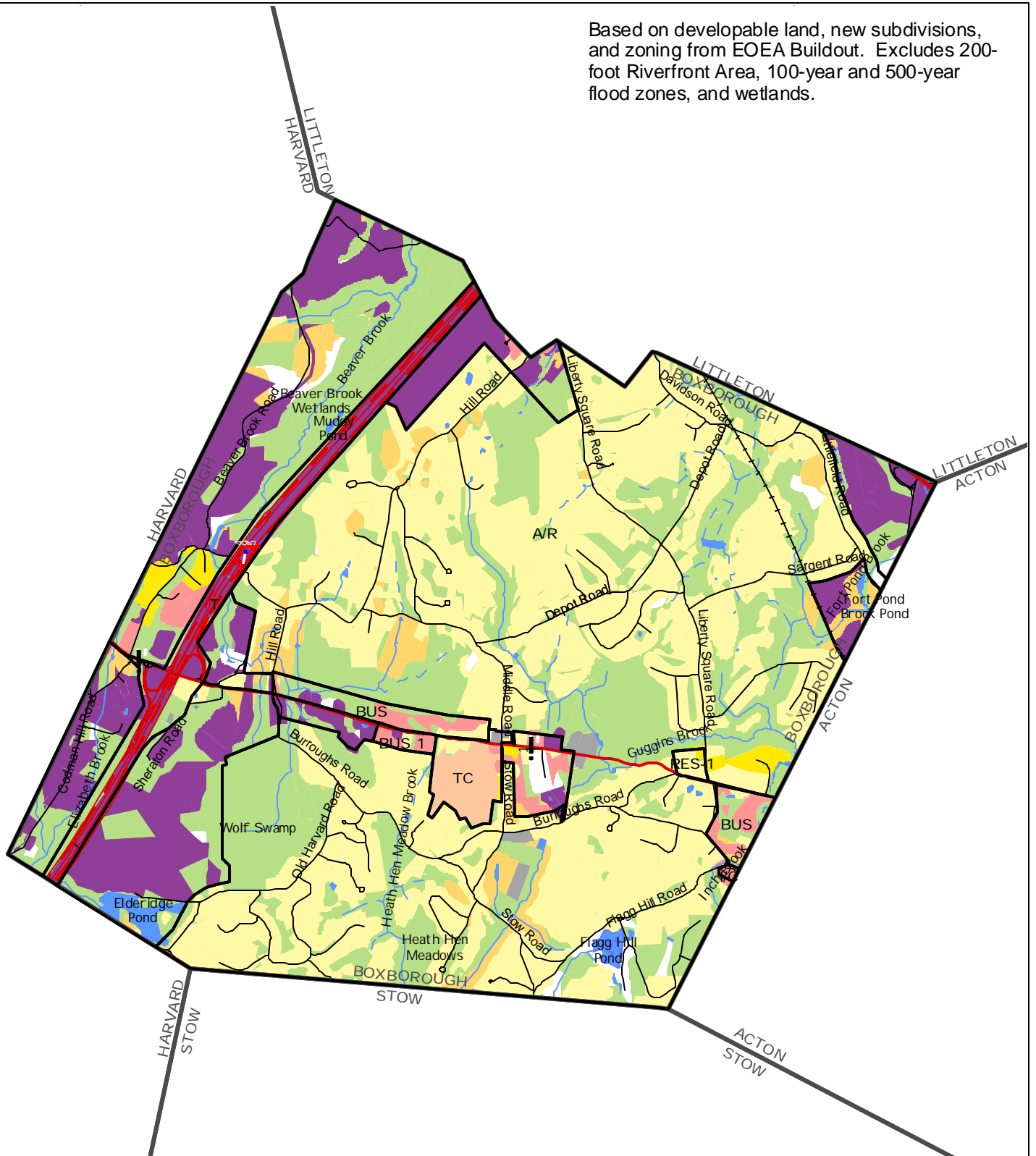
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1999 Land Use

Source: MassGIS, Town of Boxborough
June 1, 2001
BTI Project No. W-1609.00

FIGURE 3-10
Boxborough, MA

Based on developable land, new subdivisions, and zoning from EOEa Buildout. Excludes 200-foot Riverfront Area, 100-year and 500-year flood zones, and wetlands.

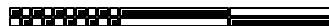


Legend

Land Use at Buildout

- low density residential
- high density residential
- mixed use, town center
- commercial
- industrial/trans./mining
- urban open/recreation
- agriculture
- natural land
- open land
- water

2000 0 2000 4000 Feet



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Land Use at Buildout Under Current Zoning

Source: MassGIS, Town of Boxborough

June 1, 2001

BTI Project No. W-1609.00

FIGURE 3-11
Boxborough, MA

CHAPTER 4 HOUSING

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HOUSING

On October 30, 2000, the Boxborough Affordable Housing Study Committee published a comprehensive report entitled, “Affordable Housing in Boxborough.” Rather than repeating the excellent work of the Affordable Housing Study Committee, this master plan incorporates and updates the information in that report and recommends actions to achieve the report’s goals. While the scope of the master plan is broader than that of the committee, much of the report information is applicable to the master plan.

GOALS AND OBJECTIVES

Goal	Ensure that Boxborough remains an affordable and enjoyable place to live by encouraging the creation of housing that is available to people of all income and age levels.
-------------	--

Objective Maintain the diversity of housing types that will result in the maintenance of a diverse population.

Objective Encourage the creation of housing for selected housing groups: young adult resident first time homebuyers, town teachers and employees, seniors 60+ years of age.

Objective Avoid the threat of Comprehensive Permits in which the town has little control.

Objective Implement the Boxborough Long Range Affordable Housing Plan.

Goal	Create incentives to develop affordable housing.
-------------	---

Objective Streamline the project approval process.

Objective Permit alternative forms of housing.

Objective The town develops its own affordable housing.

Goal	Encourage the development of housing that is consistent with the town character.
-------------	---

Objective Protect open space and other natural and cultural resources.

HOUSING TRENDS

Boxborough is a residential community consisting primarily of single-family homes. In 1990, there were 1,485 housing units in Boxborough; in 2000, there were 1,906 according to the U.S. Census, an increase of about 28%. The median assessed value increased from \$244,100 in 1990 (U.S. Census) to \$290,100 in 2000 (Boxborough Assessing Office). Except for Tisbury Meadow and Sheriff's Meadow (20 units of senior housing), no multi-family housing has been built in the past decade. All of the development has occurred as single-family homes, most of which are very large and expensive. The rental units that exist are predominantly in condominium developments where unit owners lease to renters.

Zoning History

Housing development trends have been influenced by town actions on zoning. When the town first adopted zoning in 1965, apartments (four or more units) were allowed by right in Business and Industrial/Commercial Districts with no density requirements. In 1970, the zoning was changed to require a special permit for an apartment development. In 1971 density requirements were set at ten units per acre and a minimum lot size depending on the number of bedrooms in the unit: Efficiency - 2,500 square feet, 1-bedroom - 4,000 square feet, 2-bedroom 5,500 square feet, and 1,500 square feet for each bedroom in excess of two.

In 1972 apartments were deleted from the list of permitted uses in the Business District and a new Business-1 District was created that allowed elderly or subsidized units at a density of 10 units per acre. A new Residential-1 District, near Liberty Square Road and Massachusetts Avenue was also created at a density of three units per acre. The 1972 zoning amendments were a reaction to the large number of permits for apartments being sought at that time.

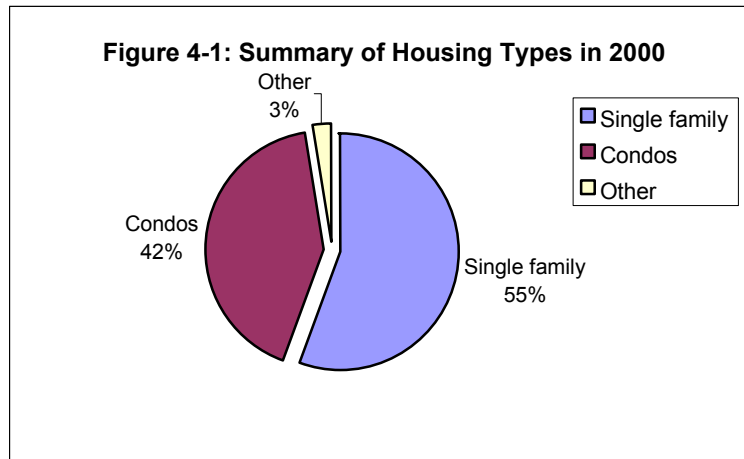
In 1988, the density in those districts where apartments were allowed was reduced to ten units over 80,000 square feet; the minimum land area for apartment type was also doubled.

HOUSING CHARACTERISTICS

Housing Supply – Housing Units by Type

The Boxborough housing stock is approximately 55% single-family homes and 42% condominiums. Two-family homes and apartments comprise the remainder of the housing units. Most of the multi-family units were built in the 1970s as apartments and

were later converted to condominiums. The condominium market was overbuilt during that time and prices became depressed. Even though the prices have rebounded, many of the condominium units are still considered to be affordable by prevailing market standards.

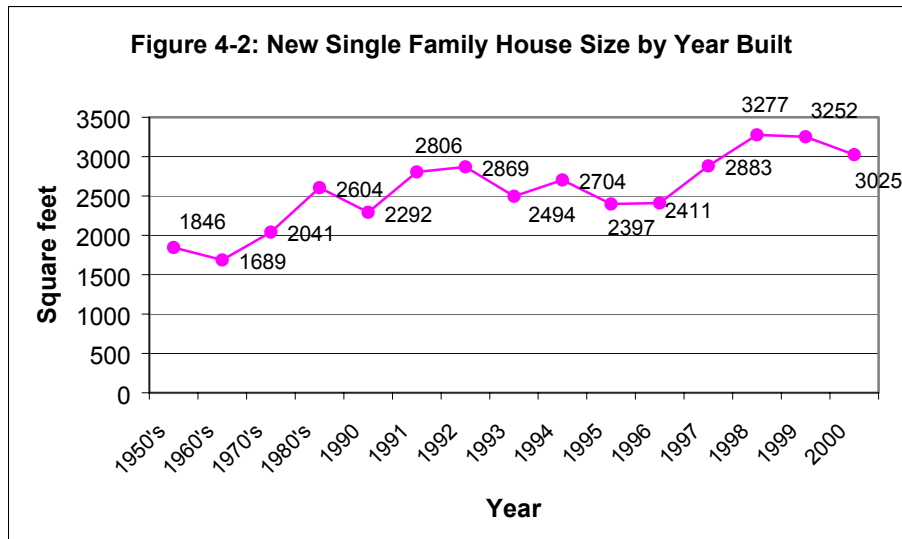


Source: Boxborough Town Planner

The single-family housing market and the condominium housing market have very different characteristics. While the single-family sales prices have climbed steadily over the past decade, the condominium market has fluctuated. Nevertheless, condominiums are still affordable in the economic sense, even though without deed restrictions they cannot be counted towards the state's housing goal of affordable housing under MGL Ch. 40B.

House Size

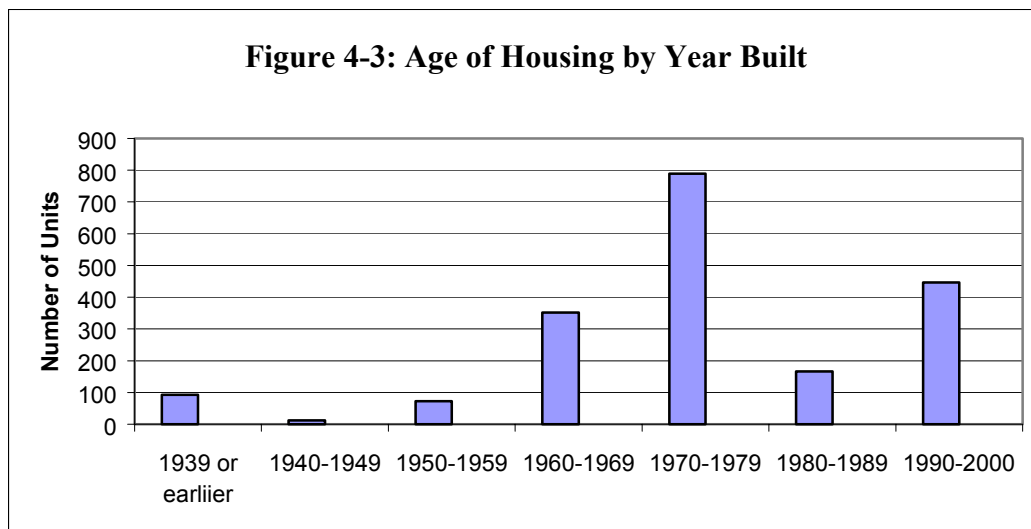
One of the reasons that the new house prices have continued to rise is the increasing house size. In the first half of the 1990s, the average home size was approximately 2,600 square feet. During the later half of the 1990s the size increased to approximately 3,200 square feet. Condominiums are about 450-900 square feet in size for one and two bedroom units. Not only does the increasing house size drive up the cost of housing, it also limits the type of family who could purchase a home. In short, it limits housing diversity.



Source: Boxborough Assessor's Office

Age of Housing

Most of the approximate 1,906 housing units that existed in 2000 were constructed in the last 30 years. During the 1970s most of the town's 770 condominiums were built. The activity during the 1990s was the creation of almost 20 subdivisions with 446 new single-family homes. This represents about 23% of Boxborough's housing stock.



Source: U.S. Census and Boxborough Town Planner

Single-Family Homes

Single-family home prices have continued to move steadily upward. In 1990 the median sales price was \$185,000; it climbed to \$419,900 in 2000. For smaller, older homes (1,100-1,300 square feet.), sale prices are in the \$200,000-\$300,000 range with a few below \$200,000. The newer, larger homes have sold in the

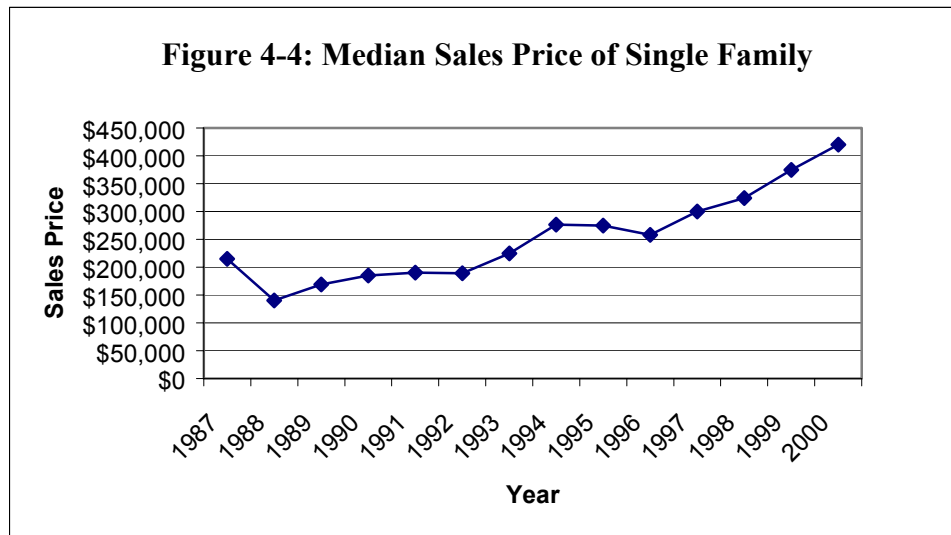
\$400,000-\$530,000 range. From 1998-2000, only three single-family homes sold for less than \$200,000 with prices ranging from \$180,000-\$191,000. The upper end of Boxborough's housing market follows a trend of increasing home size and prices that began in the 1970s. As the median house price crosses over the \$300,000 threshold, home ownership is out of reach for most people, particularly those who work for the town, first time home-buyers, many of whom grew up in the town, and the elderly.

Figure 4-4 shows the price trend of single-family homes, while Table 4-1 shows the price breakdown during the last few years. One can see the median prices have continued to increase, especially for larger homes. The median price of a four-bedroom home went up almost 41% from 1998-2000.

Table 4-1: Breakdown of Single-Family Home Sales 1998-2001

	Median Sales Price (\$)	Price Range (\$)	Number of Bedrooms	Number of Rooms	Median Assessed Value (\$)
1998 Total	360,000	244,500-630,000			335,900
	NA	NA	2	NA	NA
	301,500	229,000-379,500	3	5-8	310,500
	373,750	224,500-630,000	4	7-13	375,500
	470,000	422,000-505,000	5	10-12	445,000
1999 Total	386,350	187,500-639,000			340,000
	193,500	187,500-200,000	2	5	186,800
	303,250	235,000-476,000	3	6-9	282,500
	416,000	299,000-639,000	4	7-12	420,200
	412,000	302,500-578,900	5	9-12	357,900
2000 Total	486,000	180,000-696,875			355,200
	191,000	191,000	2	6	180,600
	343,100	180,000-585,075	3	5-9	267,400
	536,500	267,000-696,875	4	7-9	401,600
	528,630	458,000-538,575	5	9-11	426,500
2001 to (6/1/01)	485,000				383,300
	463,675	250,000-677,350	3	6-8	350,100
	500,000	356,900-795,000	4		392,450
	495,000	495,000	5	10	328,100

Source: Boxborough Assessing Department, Beals and Thomas, Inc.



Source: Banker and Tradesman

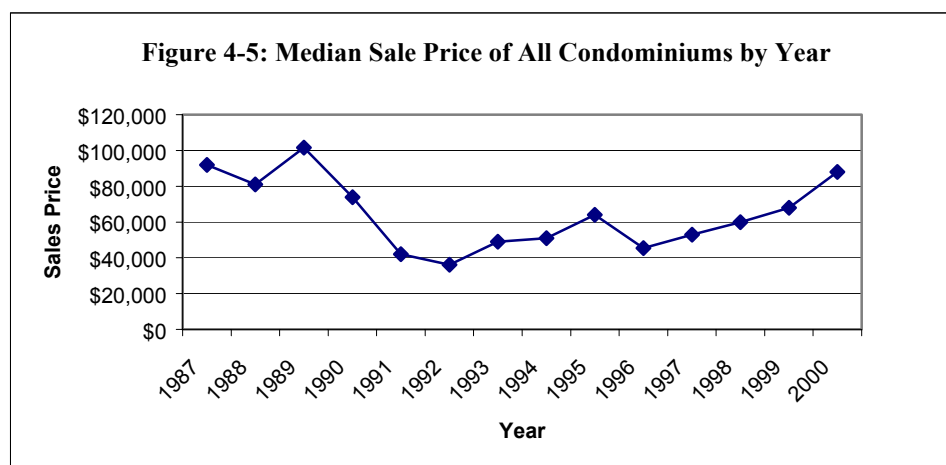
Condominiums and Apartments

Condominiums and apartments must be considered together because so many condominiums have been purchased and then leased by the owners for rental income. Typical rents are \$700 for a studio apartment, \$800-\$1,000 for a 1-bedroom unit and \$1,200-\$1,700 for a 2-bedroom unit. The 3-bedroom units in Applewood are rarely rented. One recent example was \$2345/month. The condominium sales prices fluctuated during the 1990s. The median sales price in 1990 was \$73,800 and in 2000 was \$88,000. Table 4-2 below shows that one and two bedroom units are generally still affordable – under \$100,000. Most of the condominium units are located west of I-495 in multi-unit buildings. The Applewood townhouses and age-restricted Tisbury Meadows and Sheriff's Meadows units differ in building type, are larger and, therefore, command higher sales prices. Applewood townhouses containing 2 and 3 bedrooms appeal to families with children and sell in the \$190,000s, while Tisbury Meadow and Sheriff's Meadow units are large, one-story, 2-bedroom units for seniors that are being sold for \$230,000. Table 4-2 below illustrates the condominium housing sales trends 1998-2001 for different types of units.

Table 4-2: Breakdown of Condominium Sales 1998-2001

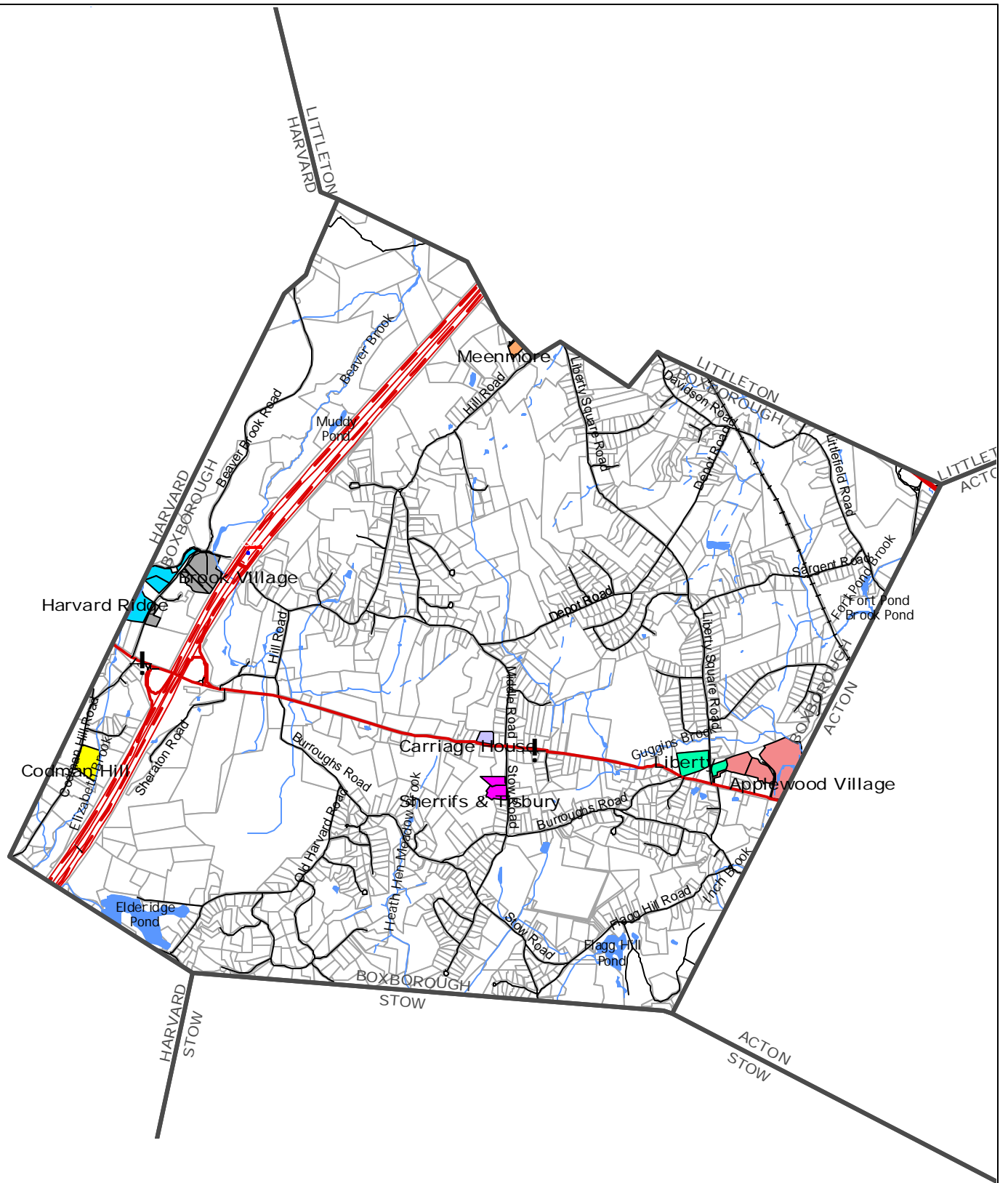
	Median Sales Price (\$)	Price Range (\$)	Number of Bedrooms	Number of Rooms	Median Assessed Value (\$)
1998 Total	62,000				71,130
	47,750	20,625-60,000	1	3-4	48,930
	73,000	221,400	2	4-5	83,860
1999 Total	68,000				61,800
	48,900	43,000-68,000	1	2-4	49,680
	85,000	48,000-250,000	2	4-5	81,800
	192,500	192,200-193,640	3	5	192,900
2000 Total	87,250				69,200
	67,800	56,000-78,000	1	3-4	50,925
	91,000	61,000-230,000	2	4-5	79,870
	215,500	212,000-219,000	3	5	182,980
2001 to (6/1/01)	91,000				61,900
	72,250	70,000-74,500	1	3-4	50,300
	105,000	78,900-171,000	2	4-5	74,650
	257,500	257,500	3	5	188,200

Source: Boxborough Assessing Department, Beals and Thomas, Inc.



Source: Banker and Tradesman

There are few apartments in Boxborough (0.4% of all units); however approximately 64% of the condominium units are rented and, therefore, function as apartments in the marketplace. Table 4-3 shows the condominium developments and the amount of owner versus renter occupancy and Figure 4-6 shows their locations.



2000 0 2000 4000 Feet



BEALS AND THOMAS, INC.

Civil Engineering
Environmental Services
Landscape Architecture
Land Surveying
Planning
Project Permitting

Reservoir Corporate Center
144 Turnpike Road (Route 9)
Suttonbury, MA 01772
Tel: (508) 366-0560
Fax: (508) 366-4391
mail@btweb.com
http://www.btweb.com

Condominiums

Source: MassGIS, Applied Geographics, Inc.
Town of Boxborough
September 10, 2001
BTI Project No. W-1609.00

FIGURE 4-6
Boxborough, MA

Table 4-3: Condominium Developments in Boxborough

Location	Total Units	Owner Occupied	Rental Investment	% Owner Occupied
Codman Hill Condominiums	108	15	93	14%
Harvard Ridge Condominiums	176	74	102	42%
Brook Village Condominiums	192	53	139	28%
Carriage House Condominiums	30	4	26	13%
Meenmore Condominiums	96	35	61	36%
Applewood Village Condominiums	84	69	15	82%
Sheriff's Meadow and Tisbury Meadow (age 55+ only)	20	20	0	100%
Liberty House Condominiums	24	1	23	4%
Liberty Village Condominiums	41	10	31	24%
TOTAL	771	281	490	36%

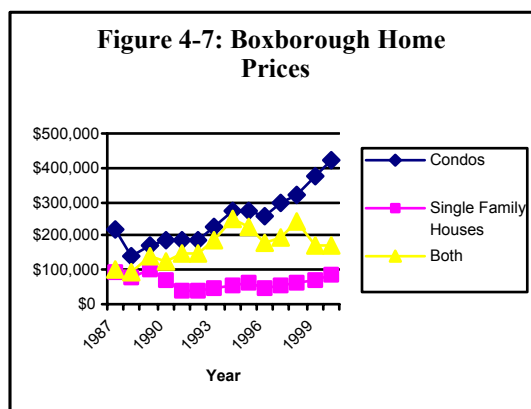
Source: Affordable Housing in Boxborough Report and Recommendations – October 30, 2000

Most of the condominiums are in “garden-style” buildings. However, there are two condominium developments that are different and must be looked at separately from the others. The Applewood development contains two and three-bedroom townhouse-style units with small groups of units in each structure. At approximately 1,300-1,400 sf. per unit in size, these dwellings are about 50-100% larger than most of the other condominium units. They are correspondingly more expensive. In 2000, Applewood units sold for a median sale price of \$191,400. Because of their larger size and townhouse style, these units are more appealing to families with children. Not surprisingly, the average number of children per household in this development is 0.49 versus 0.185 for other non-elderly condominium units.

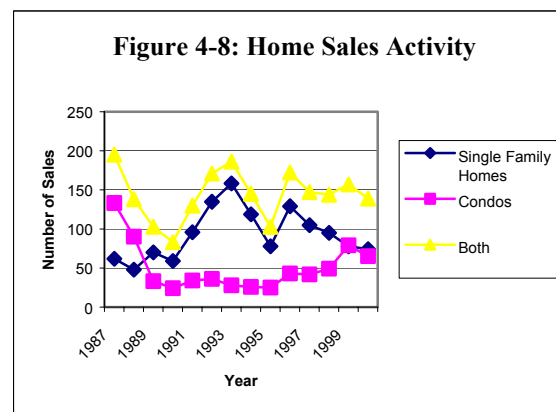
Another development that is different from the others is the housing for people over 55 years of age. Sheriff's Meadow contains twelve units and Tisbury Meadow contains eight units. These are one story, attached dwellings with attached garages, designed as retirement living for this older age group. All of the units contain four rooms and two bedrooms in approximately 1,350-1,600 square feet of floor space. Because of their larger size and focused market, the selling price of these units was approximately \$230,000 in 2000.

HOME PRICES AND HOUSING MARKET

Taken together, the single-family homes and condominium sale prices paint an interesting picture. While the number of condominiums has remained level, the number of single-family homes has increased. Although the number of single-family home sales has decreased in the past few years, the prices have continued to rise despite the fact that more single-family houses came on to the market. Furthermore, the prices of condominiums, although fluctuating slightly, have remained relatively constant with no increase in supply, while the prices of single-family homes have escalated dramatically in the past 14 years. These figures reflect the high demand for quality homes in the single-family housing market.



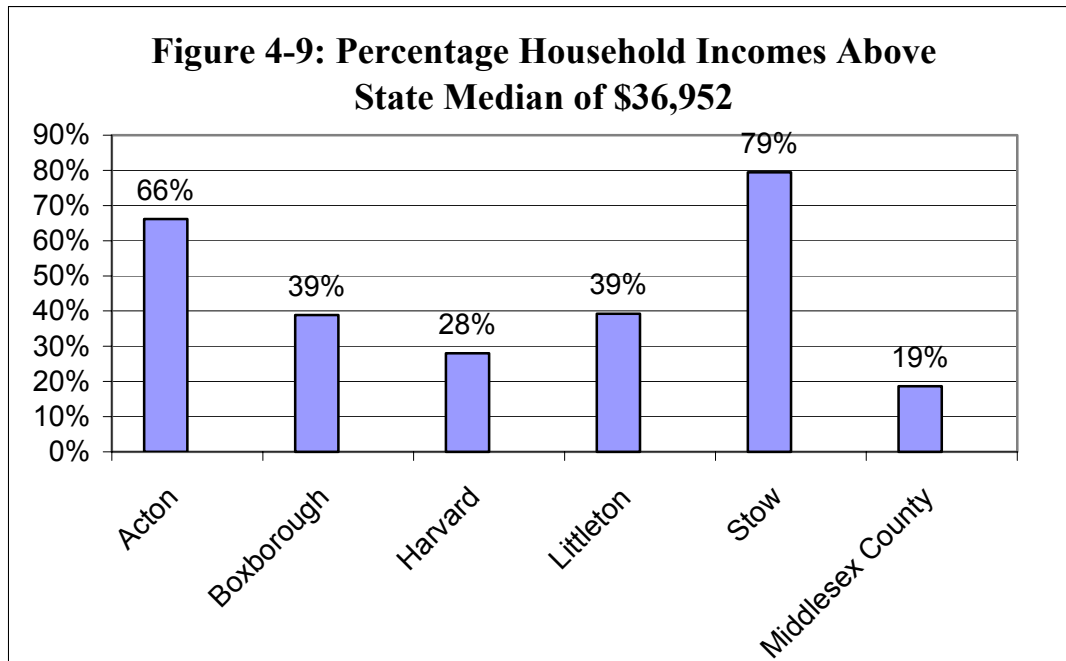
Source: Banker and Tradesman



HOUSEHOLD INCOME

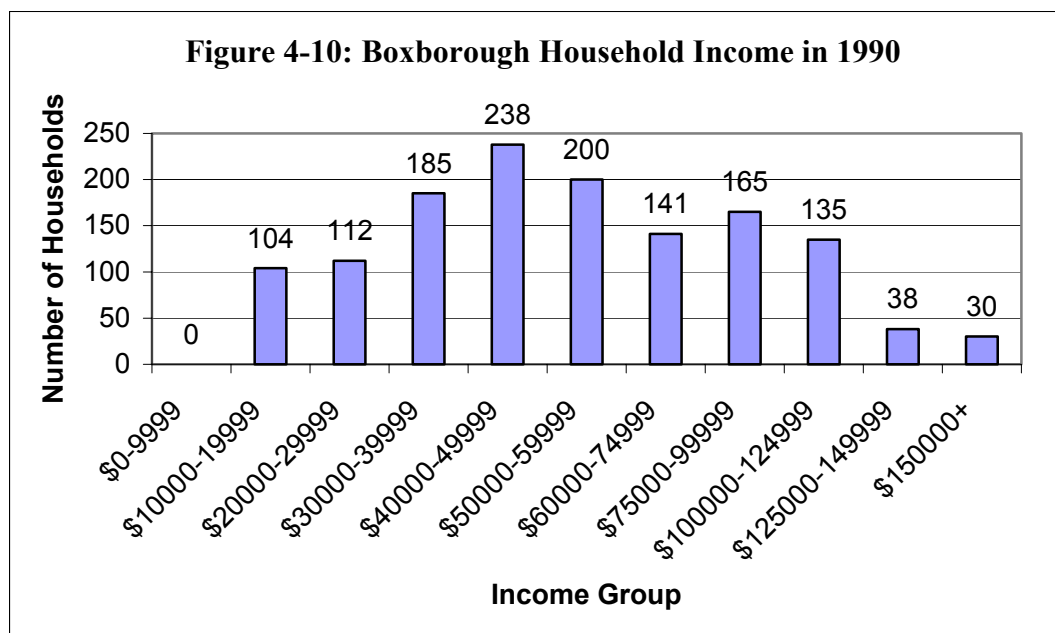
Income is the key factor in determining how much housing a household can buy. It is also a guide to estimating local housing needs. Although it would be beneficial to have the accuracy of the 2000 U.S. Census, the most recent family income information is from the 1990 U.S. Census. Nevertheless, the 1990 information is an indicator of the income distribution in Boxborough. The median income in Boxborough in 1990 was \$51,330, well above the state median of \$36,952. Given the inflation rate since 1990, the median income in Boxborough today is an estimated \$68,720.

In 1990, the median house value was close to \$250,000 - four times the median income. Approximately 18% or 238 Boxborough households had incomes between \$40,000-\$49,999; another 25% (341 households) had income less than \$40,000, illustrating why many residents perceived that home ownership was getting beyond the reach of the people who live in the town. These people would have qualified for affordable housing under the U.S. Department of Housing and Urban Development guideline of 80% of the metropolitan area median income.



Source: U.S. Census 1990

Below is a detailed breakdown of household income in Boxborough.



Source: U.S. Census 1990

Table 4-4 shows how income has lagged behind the costs of home ownership. In 1980, the price of housing and the income required for home ownership was relatively low. While the price of single-family homes has increased dramatically, the cost of condominiums has remained low allowing households of lower incomes to achieve home ownership.

Table 4-4 Homes Ownership and Income

Homeownership and Income Required						
	Single Family Homes				Condominiums	
	1980	1990	2000	2001	2000	2001
Average Assessed Value	84,100.00	250,000.00	298,790.00	332,920.00	78,778.00	74,419.00
20% down payment	16,820.00	50,000.00	59,758.00	66,584.00	15,755.60	14,883.80
Mortgage principal amount	67,280.00	200,000.00	239,032.00	266,336.00	63,022.40	59,535.20
Monthly principal and interest cost	614.21	1,825.84	1862.03	2140.45	564.38	520.36
Interest Rate	0.11	0.11	0.08	0.08	0.08	0.08
Monthly insurance cost	28.03	83.33	214.13	238.59	56.46	53.33
Monthly tax cost	70.08	208.33	420.30	468.31	110.81	104.68
Monthly housing payment	712.32	2,117.50	2,496.46	2,847.35	731.65	678.37
Annual Income Required	30,276.00	90,750.00	110,097.00	118,923.00	31,356.00	29,073.00

Assumptions 1980 and 1990: Insurance = \$40.00/\$10,000 in value; taxes = \$10/\$1000 in assessed value.

Assumptions 2000 and 2001: Insurance = \$86.00/\$10,000 in value; taxes = \$16.88/\$1000 in assessed value.

The 2000 and 2001 condominium assessed values are based on an average of the units that were sold in 2000 and the first half of 2001

AFFORDABLE HOUSING

Income becomes important in determining affordability of housing. When the Affordable Housing Study Committee started its research more than two years ago, Boxborough had no publicly subsidized housing units or private units to be counted under Ch. 40B, and none were contemplated. Since that time, the Boxborough Zoning Board of Appeals has approved a Comprehensive Permit for 48 housing units, 12 of which are designated for low and moderate-income residents. This is a first step in realizing the vision of the Study Committee and later the Boxborough Housing Board: “To maintain and broaden its diversity and sense of community, Boxborough will make available a range of housing that is affordable to low and moderate income families of all generations. This housing will be in harmony with open space, conservation, and recreation lands.”³

The U.S. Department of Housing and Urban Development sets income guidelines for affordable housing. These are usually 80% of the median income for the area. In the Boston area the income guidelines are:

³ Affordable Housing in Boxborough – Report and Recommendations – October 30, 2000.

Table 4-5: Income Limits for Boston Area Population

Income Limits			
Household Size	50% of median - very Low income	60% of median – Low income	80% of median – Moderate income
1 Person	24500	29400	36750
2 Persons	28000	33600	42000
3 Persons	31500	37800	47250
4 Persons	35000	42000	52500
5 Persons	37800	45360	56700
6 Persons	40000	48720	60900
7 Persons	43400	52080	65100
8 Persons	46200	55440	69300

Source: U.S. Department of Housing and Urban Development – effective April 6, 2001

Using income guidelines, a couple without children could purchase a home valued at \$100,000; a family of four could purchase a home valued at \$125,000. These income guideline figures would put single-family home ownership in Boxborough out of reach for most people. It would allow purchase of a condominium with 1 or 2 bedrooms, but not a 3-bedroom unit.

Affordable Housing Needs

Local affordable housing needs are difficult to estimate, but there are five population categories that might be included:

- Adult children of residents
- Teachers at the Blanchard Memorial School
- Boxborough's share of the teachers at the Acton-Boxborough regional schools
- Non-school town employees
- People aged 60 years and older

Adult Children of Residents – First-Time Home Buyers

There are a small number of young adults who have grown up in Boxborough and might want to continue to enjoy the benefits of the suburban rural community life. There are no estimates of what that number might be, but the Affordable Housing Study Committee felt that 3% of high school seniors through college graduates, ages 19-24, might fit this category. There are 54 high school seniors and approximately 257 people ages 20-24. In the next ten years, that number for the 19-24 age group is expected to grow to about 527. Thus, the number of young adults seeking housing outside of their resident family home would be eight currently, and an estimated 16 in 2010. Over the next decade the demand for affordable units in this category would be over 100 units.

Local and Regional School Teachers

The number of Blanchard teachers that might be income-qualified was determined from town payroll record using the 80% of Boston MSA median income. This does not consider the possibility of other household income that might disqualify a teacher. The number of regional schoolteachers was estimated to be ten percent

of the qualified Blanchard teachers. Teachers living in nearby towns who wish to live in Boxborough might offset the number of teachers choosing to live out of town.

Non-School Employees

The same methods and assumptions for determining the number of qualified teachers were used for other Boxborough employees. This group was scaled to the total town population.

Families Below Poverty Level in 1990

According to the 1990 U.S. Census, there were eight families, all single female heads of households, with incomes below the poverty level. All of these households had children under the age of 18. The total number of individuals was 29 or 0.9% of Boxborough's population. For a parent with one child, the poverty threshold was \$9,009, with two children \$10,530. In 1990, there were 34 households or about 2.5% with incomes less than \$10,000. An income of \$10,500 in 1990 would translate into a threshold of \$14,700 in 2000.

Seniors

Seniors are defined as those people 60+ years of age. They are a fast-growing segment of the population. In 2000, they were approximately 7.6% of the total town population. By 2020, the 60+ age group is expected to be over 21% of the total town population.

Table 4-6: Population 60+ From 1970 to Estimated 2020

	60-64	65-69	70-74	75+	Total	% Change From Previous Decade
1970	7	55*		19	81	
1980	30	96*		18	144	77.8%
1990	72	57	31	41	201	39.6%
2000	142	148*		82	372	85.1%
Est. 2010	318	311	176	232	1037	123.0%
Est. 2020	312	418	309	525	1564	50.8%

Source: U.S. Census; estimated numbers from MAPC

*Represents population aged 65-74

The number of seniors who qualify by income for eligibility was estimated with the assistance of the Council on Aging, based on the number of seniors taking advantage of various assistance programs. In 2000, that number was 10-12 out of an estimated senior population of 201. Thus, about five percent of the senior population might be income qualified for affordable housing. In 2020, that translates into an estimated 78 seniors.

Table 4-7: Summary of Housing Needs

	YEAR		
	2000	2010	2020
Baseline housing units			
• Condos and apartments	814	814	814
• Baseline (2000) single-family and duplex units	1092	1092	1092
• Single-family unit growth	0	250	539
• Total existing units	1906		
Total projected units		2156	2445
Ch. 40B units needed – 10% of baseline	181	216	244
Local need by category			
• Adult children of residents	15	17	19
• Blanchard and AB regional teachers	47	49	49
• Non-school employees	20	26	26
• Seniors 60+	10	21	33
• Families needing assistance	17	19	21
TOTAL ESTIMATED LOCAL UNIT NEED	119	132	148

IMPLEMENTING A HOUSING STRATEGY

The Affordable Housing Study Committee recommended a series of implementation actions. The first was the establishment of a Boxborough Housing Board. The recommendations also included, conversion of condominium units to deed-restricted affordable housing, town acquisition of land for the development of town-controlled affordable housing, and zoning changes to encourage development of affordable housing.

Boxborough Housing Board

After analyzing the alternatives of a housing authority, local housing partnership, and private non-profit organization, the Affordable Housing Study Committee recommended that a housing board be established. The Boxborough Housing Board Bylaw was adopted by the October 2000 Special Town Meeting. The Board, appointed in January 2001, consists of five members. The Housing Board won approval of the Affordable Long-Range Housing Plan at the May 2001 Town Meeting.

The key responsibilities of the Board are:

- Develop detailed implementation and funding plans for affordable housing and bring them to Town Meeting for approval.
- Manage affordable housing production programs.
- Conduct real estate transactions for unit conversions to affordable housing.
- Act at the town's agent on private affordable housing projects.
- Oversee affordable housing lottery and re-sales.

Open Space Affordable Housing

In order to prevent the potential adverse impacts of a private development resulting from a comprehensive permit under Chapter 40B, the Affordable Housing Study Committee recommended a balanced proportion of existing unit conversions complemented with low-density Open Space Affordable Housing (OSAH). Under this concept the town, through the Boxborough Housing Board, would develop affordable housing on town-owned land. These housing developments would be designed to preserve open space and provide access for all residents to recreation and conservation land. The Housing Board would present project proposals and plans for Town Meeting approval. The OSAH would maximize both town control of project design and affordable housing with minimal impact on build-out population and density. All units would be deed restricted affordable housing and there would be no market-rate units to offset the cost of the affordable ones, sparing the town of excess build-out. Conservation restrictions on common lands within the development would ensure the preservation of open space for conservation and recreation purposes. The town, however, would need to acquire and/or designate parcels for this development and secure funding. Under this program the town would retain ownership of the land. The Study Committee estimated that over 20 years 100 units would be built on 60-80 acres of land in the Agricultural-Residential, Industrial-Commercial and Office Park zoning districts.

The Affordable Housing Study Committee envisioned that the OSAH could be achieved through a partnership with a non-profit organization similar to the State's Local Initiative Housing program. Such an organization would ensure recognition of the deed-restricted affordable units, initiate town-sponsored development, and cultivate cooperation with developers for affordable housing.

Conversion of Existing Units

The Affordable Housing Study Committee estimated that 100-120 condominium units and a few single-family homes would be acquired and converted to deed-restricted affordable housing through the Boxborough Housing Board with minimal impact on town tax revenues and cost of services. Although this number of units may be achieved in the long term, the number of condominium sales per year may be less than anticipated. During 1998-2000, 157 condominium units were sold, about 57% of which were within the U.S. Department of Housing and Urban Development guidelines of \$78,000 for a one or two-bedroom unit. If these market trends continue, it is optimistic to think that all of the potentially affordable units could be purchased and deed-restricted. However, 5-10 units per year is an achievable number.

Special Permit Process

The Study Committee recommended an Affordable Housing Special Permit process be created to allow conventional housing development at slightly higher (10%) density in exchange for special permit fees. The fees collected would go into an affordable housing capital development fund to be used to further the affordable housing plan for such things as purchase of land for the development of affordable housing or purchase of condominium units for deed-restricted affordable units. The benefit of this kind of

development in addition to the fees collected would be the town control of the subdivision design and better opportunity to protect natural and cultural resources.

While this proposal appears to be a reasonable exchange of benefits, Massachusetts Courts have generally treated any fee (beyond an submission/review fee) as an unfair tax. To date, Massachusetts does not allow impact fees (except on Cape Cod as allowed by the Cape Cod Commission Act); however, exactions are permitted. Therefore, until it can be shown that the above proposal is legally defensible, the Town should consider other options to accomplish the same goals.

An inclusionary housing bylaw would essentially require every developer who proposes a subdivision (over some threshold number of units) to include a set-aside for affordable housing. This form of exaction is defensible. Since the Commonwealth requires that each community provide a minimum of 10% of its housing stock as affordable housing, as defined by statute, each market rate development that does not provide such housing essentially waters down the affordable housing stock. Therefore, the requirement simple helps to maintain the status quo. A flexible inclusionary housing bylaw might accommodate the town's goals, while placing a relatively minor burden on the property owner/developer. The Zoning bylaw could be amended to provide a requirement for 10% of the units developed to be affordable. The affordable units, for example, could be provided within the proposed development, or alternatively off-site in a deed-restricted condo or rental unit that would be conveyed with the appropriate regulatory agreement for the unit to count toward the town's affordable housing stock.

Accessory Apartments

Although accessory apartments are not allowed under current zoning regulations, accessory apartments have historically been used in many communities as an affordable housing resource. Because they are often smaller than average in size, owners of the primary residence charge less for accessory units than other apartments. The key to accessory apartments is that they should be in structures that are owner occupied so that they do not than become apartment buildings. The advantage of such units is that they are within existing housing structures and, therefore, have little impact on open space. Another advantage, especially for seniors, is that the income from accessory apartments can help seniors stay longer in their homes, or can be used for home maintenance for people on fixed incomes. It is difficult to determine if there are any accessory apartments in Boxborough. Any legal units that do exist would be pre-existing and non-conforming. The Zoning Bylaw would need an amendment to permit accessory apartments. In most communities accessory apartments are allowed by special permit, although there are ways to permit them by right with limits on the size of the accessory unit and design standards.

Table 4-8: Summary of Potential Affordable Housing Units Production

	2005	2010	2020
Private development subdivision	18	22	25
Private non-profit partnership	7	9	10
Open Space Affordable Housing development	65	82	92
Conversions	30	75	150
Accessory apartments	0	10	20
TOTAL	120	198	297

CONCLUSION AND RECOMMENDATIONS

Housing issues in Boxborough fall into two categories: how to encourage the development of housing that fits the character of the town (and discourages “mansionization”) and how to create diversity of housing types so that people of all ages and incomes can live in the town. The first issue can be addressed through regulatory controls such as requiring that a lot contain a minimum amount of open space and setting a limit on how much building may cover the lot.

The second issue of housing diversity and affordability requires a multi-pronged approach. The town can create incentives for private development of new affordable units. The town can also go into the development business and create affordable units on town-owned land. The town needs almost 200 affordable units today to meet the state requirement of ten percent. Creation of affordable housing requires a long and sustained effort to educate the public about the needs for and the value of housing diversity. The implementation of the Boxborough Affordable Housing Plan is a first step toward providing affordable housing. Other housing actions are detailed in Chapter XI: Action Plan.

CHAPTER 5

ECONOMIC DEVELOPMENT

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ECONOMIC DEVELOPMENT

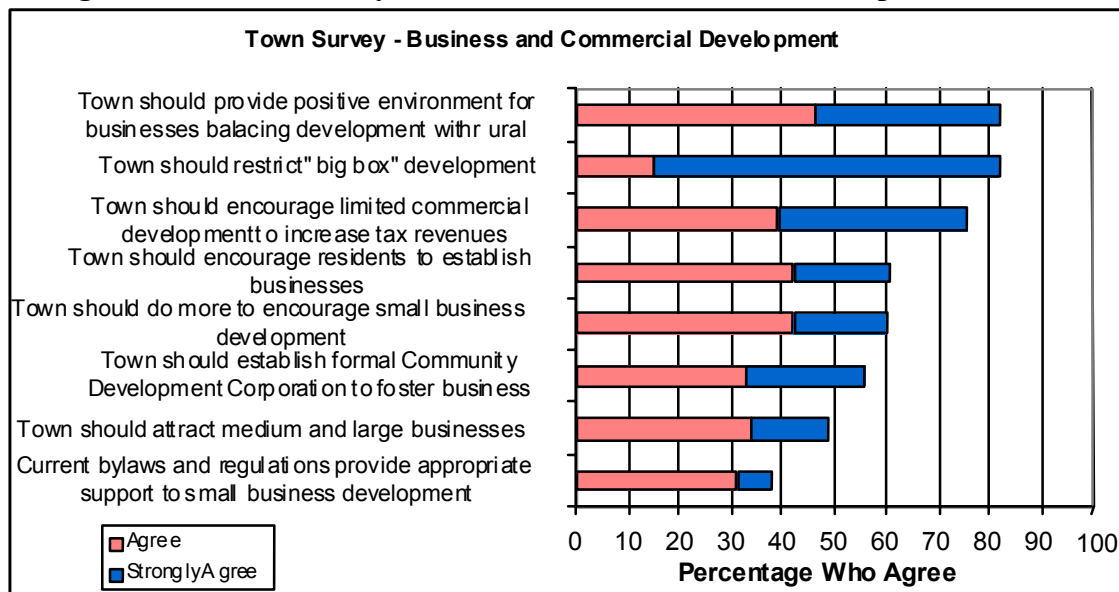
GOALS AND OBJECTIVES

The goals derived from various planning studies over the past few decades are consistent with the goals identified in this Master Plan. Boxborough's Balanced Growth Plan from 1984 recommended that:

1. Water supplies should be protected from contamination.
2. Town should maintain rural character.
3. Business and industrial development should serve the town's needs, rather than those of other communities or developers.
4. Development should not force significant increases in tax rates.
5. Traffic congestion should be minimized.

The 2000 Town Survey indicated that residents are in favor of allowing limited development to increase tax revenues and that they do not want "big box" commercial retail development. The types of development that residents prefer are small businesses, especially those owned by Boxborough residents, and businesses that fit with the rural character of the town. Just over half of the respondents favored encouraging the development of medium to large businesses to diversify the tax base. Residents have emphasized, however, that new development should not be at the expense of their natural resources, particularly water and water quality, open space, and scenic areas. Some residents have expressed concern that the Cisco development will introduce regionally-oriented development in Boxborough.

Figure 5-1: Town Survey – Business and Commercial Development



Source: Boxborough Town Survey 2000

Through a 2001 public participation process involving committee meetings, public workshops, and interviews, the following goals and objectives were identified related to employment, tax base, and the existing and future needs of business in Boxborough. The goals listed here have been consistent over time and embody the same desire to protect Boxborough's character and natural resources without placing undue tax burdens on the residents.

Goal	Balance the tax base between residential and non-residential development so that the tax burden can be shared.
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Objective Avoid overburdening the residential tax base.

Objective Permit sufficient non-residential development to keep pace with residential growth.

Objective Encourage non-residential development that is appropriate for the town's needs; large-scale office and research and development developments rather than large-scale retail uses.

Goal	Ensure that future development is consistent with the town's character and does not impair the town's infrastructure or natural resources.
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Objective Focus on the protection of the developable portions of Route 111.

Objective To have Town Center developed in typical New England fashion, with pedestrian access, a green space and retail that remains open into the evening.

INTRODUCTION

Boxborough is primarily a rural suburban community with some traditional agriculture and in-home small businesses. The town has historically had primarily small local businesses and very little commercial retail. Presently, commercial land accounts for 6% of the land in Boxborough. Residents are trying to maintain that trend and retain the large amounts of open space that have defined Boxborough as a rural community. Realizing that these goals need to be balanced by increasing and diversifying the tax base, residents are in favor of encouraging limited development.

Because Boxborough has no public water supply and no public sewer system, commercial and industrial developments must provide their own water supply and wastewater treatment systems. Larger commercial developments must also ensure that there is enough water for fire protection and depending on the amount of effluent they produce, they must install a wastewater treatment plant. Although there are presently no public wastewater treatment plants in Boxborough, there are several small ones for condo developments and proposed plants for a number of private developments including the two Cisco sites. Boxborough's rural character then places infrastructure constraints on potential development.

Early Economy

At its inception, Boxborough was a farming community. Boxborough farmers began transporting their crops in the 1800s to early 1900s to markets in Boston and Worcester. Apple growing and cattle grazing were prevalent in Boxborough during the early half of the twentieth century. Gristmills, oil mills, and cider mills were located in town as a result of flax, wheat, and apple farming. Cooper shops and sawmills also were established to build barrels for crops grown and produced in Boxborough.

Historically Boxborough has had little need for retail commercial development. The town's first general store on record opened in 1806 at the northern end of Middle Road and through the years a variety of other small business grew up to serve local needs such as the Lawrence Tavern, Pop's, Wetherbee Arms, Ma's Lunch, Mac's, and the Wetherbee Garage. In the 1960s, several businesses located in Boxborough including Boxboro Sheet Metal, B & F Exxon, and Norm Card Plumbing and Heating, among others.

The Sheraton Hotel (now Holiday Inn) opened in 1975 along with Harry's Tavern and the Garden Court restaurant. Boxborough residents worried about potential problems of additional traffic and policing, but Boxborough was in need of business to broaden its tax base, so permits were approved. In the mid-1980s, Nippon Electric Company (NEC) Information Systems chose a site on the southern side of Massachusetts Avenue in

Boxborough as its United States headquarters. NEC brought commercial uses and a broadened tax base.

The Economy Today

The trend for high-tech companies to locate in Boxborough continues today partly because of the I-495 corridor appeal to “high-tech” industries. In 2000, Boxborough petitioned the state and was designated as an Economic Target Area (ETA), in anticipation of attracting Cisco Systems. Partly as a result of this designation, Cisco Systems has purchased and developed the NEC buildings along Massachusetts Avenue and is developing a second campus in the northwest corner of town along Beaver Brook Road and Swanson Road. This potential 1.4 million square feet of development will have an impact on the town and its resources. Other high tech companies that are, or have been, located in Boxborough include NEC, 3COM, Renaissance Electronics Company, Nortel, Lucent Technologies, Advanced Modular Systems, Cytyc, FORE Systems, Setra Systems, Cascade Communications, Racal-DataCom, and Xyplex.

Local Business Inventory

The following table shows how the number of establishments in Boxborough has grown, from 1985 to 1999. The Comprehensive Economic Development Strategy, compiled by the Metropolitan Area Planning Council (MAPC), identified Boxborough as one of five communities in the MAPC region with the highest increase in number of establishments from 1990-1998 within the MAPC region.

Table 5-1: Number of Establishments in Boxborough from 1985-1999

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Establishments	66	75	85	98	106	104	105	104	104	107	123	123	129	136	150

Source: Boxborough Building Department

Existing local businesses were identified through Assessor’s records. Twenty-three parcels in Boxborough are presently in Commercial use, totaling 187.28 acres. Fourteen parcels, totaling 191.3 acres are presently in Industrial use. In total, the Industrial and Commercial uses constitute 5-6% of Boxborough’s total acreage. The following table describes the number of parcels and acreages for present commercial buildings in Boxborough. Figure 5-1 illustrates the location of these parcels. Aside from the Holiday Inn, the majority of the commercial uses serve local needs. The larger Research and Development uses such as Cisco Systems serve more regional need, but also bring regional revenues into Boxborough.

Table 5-2: Commercial Buildings in Boxborough, MA

Address	Location	Parcel Size (acres)	Building Size (square feet)	Type	Zoning
335 Burroughs Road	10-4-203	5.95	4,200	Stow Sand&Gravel	BUS
242 Adams Place	2-2-127	18.20	153,901	Holiday Inn	OP
80 Central Street	12-6-252	78.80	154,077	R&D Office	OP
60 Codman Hill Road	2-1-110	9.08	100,102	Modular Sol	IC
316 Codman Hill Road	1-1-137	2.30	13,258	Warehouse	IC
328 Codman Hill Road	1-1-138.2	8.46	44,128	R&D Office	IC
369 Codman Hill Road	1-1-104.2	2.92	7,742	Office	IC
513 Codman Hill Road	1-1-101.2	1.36	5,340	Landscaping	IC
70 Codman Hill Road	1-1-110.2	15.97	43,720	ITS	IC
22 Littlefield Road	12-6-259	1.00	2,016	Machine Precision	IC
80 Littlefield Road	12-6-357	4.90	3,280	McDonald Mechanical	IC
240 Littleton County Rd	4-1-171.2A	10.30	51,518	Office	OP
34 Mass Ave	11-4-288	10.96	55,618	Skating Rink	BUS
593 Mass Ave	6-5-323	6.13	8,340	Office	BUS
611 Mass Ave	6-5-324	1.69	3,336	DRW Motor	BUS
629 Mass Ave	6-5-325	2.47	25,072	Retail/Office	BUS
650 Mass Ave	6-4-170	1.72	1,128	Box Insurance	BUS
795 Mass Ave	6-3-148	0.96	3,718	EJ Carpet	BUS
807 Mass Ave	6-3-149	1.03	5,534	Manning Tree/CBK	BUS
827 Mass Ave	6-3-150	1.29	2,242	Office	BUS
871 Mass Ave	6-3-152	3.96	1,208	Retail	BUS
972 Mass Ave	6-4-117	1.45	2,400	Auto Sales/Retail	BUS
1034 Mass Ave	6-4-116	1.09	4,416	Office	IC
1120 Mass Ave	6-4-113	10.35	25,772	Warehouse	IC
1145 Mass Ave	6-3-155.2	15.62	19,600	Warehouse	BUS
1146 Mass Ave	6-4-112	3.49	24,850	R&D Office	IC
1170 Mass Ave	6-4-111	4.79	10,816	Manufacturing	IC
1233 Mass Ave	2-3-157	1.01	7,275	Retail	BUS
1300 Mass Ave	2-2-135	7.06	61,430	R&D Office	OP
1414 Mass Ave	2-2-209	70.94	275,047	R&D Office	OP
1425 Mass Ave	2-3-104	0.92	2,071	Service Station	IC
1744 Mass Ave	2-1-107.4	0.80	12,424	Office	IC
off Littleton County	4-1-178	42.00	2,978	Sportsmen Club	OP
25 Stow Road	6-4-129	5.00	10,619	Market/Day Care	TC
75-85 Swanson Road	2-1-163	22.15	93,904	R&D Office	OP
155 Swanson Road	2-1-160	13.24	101,480	R&D Office	OP
159 Swanson Road	2-1-159	11.06	101,480	R&D Office	OP
TOTAL		400.29	1,446,040		

Source: Boxborough Assessor's Office, 2001

Town Center

Town Center is the area surrounding the intersection of Route 111, Middle Road and Stow Road. At the 1998 Town Meeting, the Board of Selectmen appointed a citizen committee to draft a new zoning bylaw creating a mixed-use, pedestrian-oriented Town Center zoning district. Town Center zoning bylaw permits a mix of retail and residential uses.

At the 1999 Town Meeting, the Town Center bylaw was approved and 60 acres of land rezoned to Town Center. The 2000 Town Survey also asked residents to answer regarding Town Center. Residents would like to see a Town Center that contains an open, grassy area and is pedestrian friendly. Residents also indicated their preference for retail establishments that are open into the evening.

Development of a Town Center will need a comprehensive development in order to make the center economically viable and competitive with town centers of other nearby towns. Boxborough's current population is small and may not yet be large enough to economically support the small businesses that might locate in such a center. However, a proposal with mutually supportive businesses with accompanying residential development could achieve the type of town center the community desires.

Design Review Board

At the 2000 Town Meeting, Boxborough voted to create the Boxborough Design Review Board to review developments in the Town Center area, to enhance the appearance of those developments, and to preserve historic and cultural structures. The Board consists of five representatives of the Planning Board, Board of Selectmen, Historical Commission, Permanent Building Committee, and a citizen at large. The Board makes comments and recommendations to the Planning Board or Board of Appeals on applications subject to site plan review, special permit or signs in the Town Center District according to established guidelines. The establishment of this board indicates that Boxborough is already attempting to identify the type of development that is consistent with town character.

Route 111

Route 111 is the only section of the town that is generally zoned for business uses. It is the route from which Boxborough is most visible to the greatest number of people as it runs east-west through the middle of the town and connects to Route I-495. There are two small “strip malls” and a few isolated business uses, but otherwise the road retains the rural character that is defined by the trees and stonewalls along the sides of the roadway. The physical characteristics of the land abutting the roadway have prevented business development along Route 111. Many wetlands prevent access to upland behind it, even though there is frontage on the street. Some people have suggested that land along Route 111 should be rezoned to Agricultural/Residential to maintain the rural natural of the roadway, but the reality is that the business-zoned land is difficult to develop.

Residents have indicated that they do not want to Route 111 turned into a series of strip malls. Instead, people want businesses owned by local residents that serve the local community and reflect the character of the town. They prefer small businesses to “big box” stores because small businesses will not create large volumes of traffic. While the real estate market is out of the control of the town, regulations are not. In 2000, Boxborough passed a zoning amendment to limit the maximum size of retail developments to 25,000 square feet in an attempt to discourage regional chain stores that usually need larger floor area.

It is early to determine what development pressure the Cisco developments will have on Route 111, particularly since the build out and occupancy may take many years. The areas around the interchange with I-495 near the Cisco sites are zoned Industrial/Commercial and Office Park. These districts permit limited commercial uses and no retail uses. This may put pressure on the Business Districts that are located further east on Route 111, but as noted in Chapter III, Land Use, wetlands and other physical constraints may limit development in these areas. The town may want to consider allowing some commercial use in the Industrial/Commercial and Office Park districts to permit uses that support the uses that are allowed in these districts.

Economic Development Committee

In 1994, the Board of Selectmen appointed a short-term Economic Development Committee (EDC) to address the increase in property taxes and identify short term and long-term relief. The responsible development of Route 111 is an important issue for the Economic Development Committee. Another major issue that they foresee is the development of Town Center. Some of the growth management techniques that they have identified and are in the process of studying include use regulations, transferable development rights and overlay districts. They also would like to conduct an economic base analysis and learn from other economic development organizations that have been successful.

Boxborough Business Association

The Boxborough Business Association is a group of business owners in Boxborough. The group holds regular meetings, sometimes having guest speakers, like the Town Administrator and other local government officials. The BBA also reports on the impact of Zoning Bylaw changes on the Business community.

Massachusetts Economic Development Incentive Program

The purpose of this program is job creation. It permits a community that has been designated by the State as an Economic Target Area and a company to negotiate a tax arrangement acceptable to both parties. The town may negotiate public improvements, facilities or services, through a Tax Increment Financing (TIF) agreement that is approved by Town Meeting. The Boxborough TIF for Cisco Systems was voted on June 26, 2000 and will be in place for 20 years.

In 2000 Boxborough applied for designation as the 495 Regional Technology Center Economic Target Area (ETA). The economic development goals listed in the application

included diversification of the economic base, reduction of the reliance on residential property taxes for town revenue, and the creation of high-quality jobs. The town's designation as an ETA permits it to choose specific sites as Economic Opportunity Areas (EOA). Town Meeting voted to designate both Cisco sites as EOAs. This vote does not preclude the town's choosing other sites and negotiating more tax agreements with the companies located on them in the future.

The two EOAs are:

Cisco 1 (Former NEC Site) - This site totals about 140 acres of land and was previously occupied by NEC with an existing building of 277,000 square feet. It is located at 1414 Massachusetts Avenue. This site will hold an estimated 700 employees.

Cisco 2 (Former Towermarc Site) - This site has a long permitting history. Three of the buildings are under construction. This 266-acre site, located to the West of I-495 along Swanson Road, may eventually contain approximately 1,400,000 square feet of building. The Planning Board originally issued a Special Permit for seven buildings, totaling 900,000 square feet. On December 3, 2001, the Board voted to approve a revised site plan that would accommodate another 500,000 square feet.

In order to develop these sites, Cisco will create on-site water and wastewater treatment. The total number of full-time employees moving into these buildings could be 4,000. This scale of development is larger than any the town has seen. At its peak, NEC had only 1,200 employees. While residents are supportive of measures that diversify the tax base and increase high tech employment options, they are wary of the potential development pressure. Boxborough does not want large commercial retail or strip development and is concerned that the large Cisco developments will encourage spin-off developments of this nature.

Regional Considerations

Boxborough is a part of the Metropolitan Area Planning Commission, which is an Economic Development District (EDD), designated by the U.S. Department of Commerce, Economic Development Administration. As the EDD, MAPC is responsible for developing a five-year Comprehensive Economic Development Strategy (CEDS) for the region, and updating the CEDS annually. The CEDS analyzes and identifies regional issues related to economic development, and develops a set of goals and actions for addressing those issues. The analysis section of the report indicates that the Boston Area Economic Base that includes high-tech, manufacturing, consulting, universities, software, manufacturing and money management. MAPC identified some of the issues for the region. Affordable housing and infrastructure needs of outlying towns are two that impact the Town of Boxborough.

A number of technology firms have recently located along I-495, presenting opportunities for Boxborough to capitalize on this growth. Boxborough should take advantage of this opportunity, but it must also be careful that the pace and nature of development in town are consistent with its goals.

The Minuteman Advisory Group on Interlocal Coordination (MAGIC), a part of the Metropolitan Area Planning Council, has identified some of the unique aspects of the region that also apply to the town of Boxborough:

- Clusters of high-tech firms
- Available commercial and industrial land, with large parcels for campus settings
- Excellent schools
- Higher than average disposable income
- Scenic natural beauty
- Strong sense of history
- Highly educated work force

The I-495 Initiative is a collaboration of public and private agencies, companies, and individuals that have come together to address the area's region-wide concerns, including traffic, water and sewer and permitting. Many of the I-495 communities are experiencing growth problems similar to Boxborough. Metropolitan Area Planning Council and the Massachusetts Technology Collaborative are responsible for the Initiative with funding coming from the State Legislature via the Massachusetts Office of Business Development and contributions from corporations.

Employment

Trends

The following table depicts the average annual wage, measured by place of employment, for Boxborough and surrounding communities from 1985 to 1999. The average annual wage in Boxborough has grown considerably, when compared to the surrounding towns, since 1985 reflecting the influx of high tech jobs to the town.

Table 5-3: Average Annual Wage by Place of Employment for Boxborough and Surrounding Communities from 1985 and 1999

	Acton	Ayer	Bolton	Boxborough	Carlisle	Harvard	Littleton	Maynard	Stow
1985	\$ 19,006	\$ 17,600	\$ 20,451	\$ 19,725	\$ 25,296	\$ 16,069	\$ 20,687	\$ 29,999	\$ 17,638
1999	\$ 45,306	\$ 36,276	\$ 42,250	\$ 56,712	\$ 40,662	\$ 36,055	\$ 54,569	\$ 56,679	\$ 59,940
Difference	\$(26,300)	\$(18,676)	\$(21,799)	\$ (36,987)	\$(15,366)	\$(19,986)	\$(33,882)	\$(26,680)	\$(42,302)

Source: Mass. Division of Employment and Training

Table 5-4 depicts the total payroll, from 1985 to 1999. Although the trend from 1985 to 1999 is ultimately increasing, there is a sharp increase beginning in 1992 and then subsequent decline in 1994 and 1995.

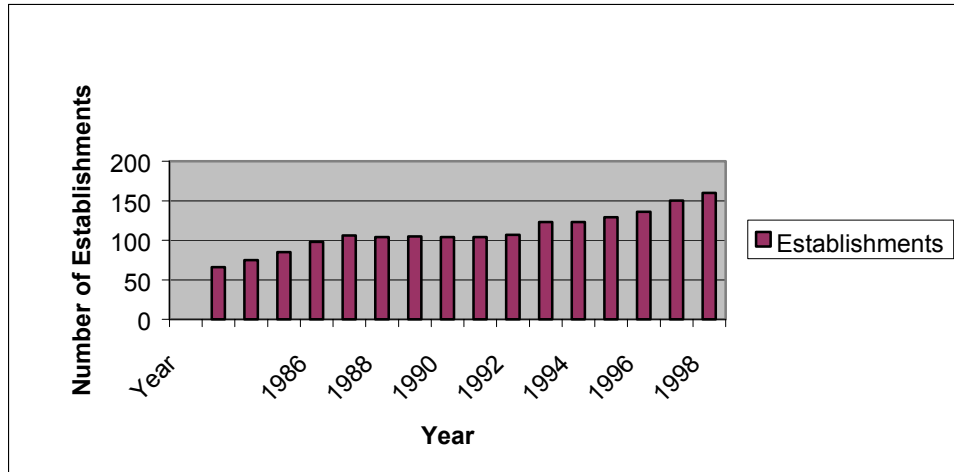
Table 5-4: Total Annual Payroll and Average Annual Wage for Companies in Boxborough, 1985-1999

Year	Total Annual Payroll	Avg Annual Wage
1985	\$12,723,000	\$19,725
1986	\$39,680,199	\$26,720
1987	\$54,800,199	\$29,010
1988	\$72,786,000	\$31,839
1989	\$71,780,529	\$30,364
1990	\$73,531,017	\$32,166
1991	\$71,760,589	\$31,894
1992	\$116,495,942	\$42,056
1993	\$136,824,851	\$45,291
1994	\$116,815,103	\$49,519
1995	\$77,341,336	\$42,194
1996	\$92,087,873	\$49,885
1997	\$98,526,832	\$50,527
1998	\$125,261,966	\$56,860
1999	\$123,065,650	\$56,712

Source: Mass. Division of Employment and Training

The early 1990s was a period of significant job influx due to the growth of high tech companies in the region. According to the Massachusetts Department of Employment and Training and the Metropolitan Area Planning Council, during those years Boxborough had the fastest job growth rate among the surrounding towns. The downward trend in employees, beginning in the mid-1990s, can be explained by the loss of NEC, Racal, Xyplex, 3 Com, and Digital. NEC closed its facilities in 1999, resulting in the overall loss of 1,200 employees. Cisco Systems Inc. is currently developing two sites that will create 4000 new jobs.

Trade, manufacturing and service industries make up the largest portion of employment in Boxborough. Although the number of jobs remained relatively stable during the 1990s, figure 5-2 indicates that the number of business establishments increased.

Figure 5-2 Number of Business Establishments in Boxborough, 1985 – 2000.

Employees in Boxborough – Present

According to the Department of Employment and Training, there were 2,170 employees in Boxborough in 1999. Following is a list of the largest employers in Boxborough. The majority of people who work in Boxborough work at the research and development and office facilities. The Town of Boxborough is also one of the larger employers. The Housing Chapter addresses some of the concerns about these employees being able to afford housing in Boxborough.

Table 5-5: The Largest Employers in Town

Employer	Number of Employees
Cisco Systems	350 (new development - 4,000)
Cytec	275
Town of Boxborough	240
Setra Systems	230
Ascend Communication	225
Lucent Technologies	213
Ennovate Networks	200
Holiday Inn	150
Nortel Networks	150
Appian	104
ITS	90

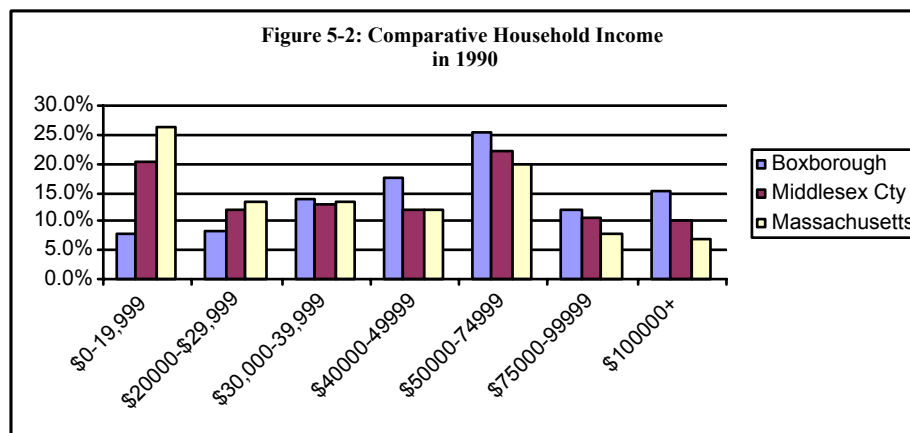
Source: Boxborough Town Planner

Comparative Income

Table 5-3 describes the Average Annual Wage for Boxborough and the surrounding towns. Compared to some of the surrounding towns, Boxborough's average annual wage, \$56,712, is relatively high, second only to Stow, at \$59,940. Additionally, Boxborough has seen a large increase in the average annual wage since 1985. The increase, again, is second only to that of Stow. The household income distribution for the State and Middlesex County has two peaks with a second peak at the low end. Boxborough has two peaks with the second peak at

the high end. This helps quantify how Boxborough is "rich" compared with the State average.

The most recent information comparing local with regional and state median household incomes was the 1990 U.S. Census. Nevertheless, the chart below illustrates that Boxborough's household incomes were higher than the State and Middlesex County averages.



Source: 1990 U. S. Census

Boxborough's unemployment rate in 2000, 1.4%, is comparable to the surrounding towns. Table 5-6 describes the unemployment rate since 1983 in Boxborough and the surrounding towns. Boxborough and some of the surrounding towns experienced a rise in the unemployment rate in 1990. All the towns appear to have experienced a drop in the unemployment rate from 1990 to 2000.

According to the 1990 Census, about 13% of Boxborough residents worked in Boxborough and about 86% worked inside of Middlesex County.

Table 5-6: Labor Force and Unemployment Rate in Boxborough with State Unemployment Rate

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Labor Force	2055	2041	2162	2285	2495	2549	2369	2478	2572	2582
Local Unemployment Rate (%)	2.7	4.7	5.9	4.5	3.4	4.5	3.2	2.6	2.1	2.5
State Unemployment Rate (%)	6	9.1	8.6	6.9	6	5.4	4.3	4	3.3	3.2

Source: Mass. Division of Employment and Training

FUTURE ECONOMIC PROFILE

An economic base analysis was performed for Boxborough in 1999. The study determined that basic industries in the town, which produce goods and services for the

regional level, include manufacturing, construction and wholesale trade. Non-basic industries, which produce goods and services for the local level in Boxborough, include agriculture, transportation, communication, retail, finance, insurance and real estate. Another pattern that has continued throughout the town's history is the lack of commercial and retail uses other than those serving local needs.

According to the buildout analysis performed by the Boxborough Town Planner, the majority of developable land and land with potential for the greatest amount of building development is located to the west of I-495. It is important to note that the Cisco 2 site, located west of 495 and along Swanson Road, is included as undeveloped land since the project is not yet completed. Figure 5-4 depicts these areas graphically.

Table 5-7 includes proposed development in Boxborough. Although these projects are already involved in the permitting process, the parcels and acreage are included in the build-out as developable acreage, except for the NEC Building, which already exists.

Table 5-7: Proposed Development in Boxborough

Project Name	Location	Building size (sq.ft.)	Status
ALONG ROUTE I-495			
Towermarc Business Park (Cisco)	Swanson Rd	900,000	Under construction
Cisco Expansion	Swanson Rd.	500,000	OSCD approved
Codman Hill Tech Center	Parcels 120-133	100,000	Site Plan approved, but not built
340 Codman Hill Road	Parcel 138.1	33,600	Site Plan approved
Boxborough Exec. Center	Parcel 105	245,000	MEPA approval; OSCD under review
Bren Shreiber Properties	80/90 Central St.	175,000	Under construction
Total proposed		1,933,600	
ROUTE 111			
NEC Building	1414 Mass Ave	277,000	Change of Occupancy to Cisco

Source: Boxborough Town Planner

Workforce

Statistics from the 1990 census indicate that 86% of Boxborough residents work outside of the town. The town unemployment rate is lower than that of the state. Residents of Boxborough are highly educated. These statistics suggest that workforce development programs and employment counseling may not be appropriate strategies for Boxborough.

MAGIC has identified a highly educated work force as one of the region's major draws. Cisco Systems with its potential 4,000 employees chose to locate its east coast headquarters in Boxborough for that reason.

Infrastructure

Boxborough's lack of water and sewer could slow the pace of development. Cisco and other large-scale developments will have to build a wastewater treatment facility and get all of its water from on-site wells. These actions require a significant investment by the developer.

Roadway infrastructure will also be a major concern for future development in Boxborough. (See Chapter IX for a more detailed discussion of traffic and circulation.) The majority of Boxborough's Industrial and Commercial development is located near major roadways, I-495 and Route 2. Traffic, however, will impact many of the town's secondary roadways. A significant portion of the commercial developable land in town is located along Route 111. In the case of Route 111, Boxborough would prefer to leave the road as it exists. Also, the Town of Boxborough is attempting to stay current with technological infrastructure. A new committee has been formed, the Boxborough Infrastructure Technology Committee (BIT.com), to address the town's needs in terms of technology infrastructure.

Housing

Housing prices in Boxborough are high (See Chapter 4). Throughout the public process Boxborough residents have indicated that housing in the town is no longer affordable. Some expressed concern that elderly parents or children cannot afford to live in Boxborough. Workers in Boxborough's small businesses and town employees, including teachers, may have problems affording housing in Boxborough. It is also likely that many of Cisco employees will be unable to afford to live in Boxborough.

Fiscal Balance

One of the criteria for decisions regarding business development in Boxborough is the balance of revenues from Residential and Industrial and Commercial uses. In its application for designation as an Economic Target Area Boxborough indicated that 73% of their town budget is spent on education and noted that one goal was to decrease reliance on Residential property taxes for town revenue. Boxborough has one tax rate for all property classifications. The tax rate in FY2000 decreased by over \$1.00, and in FY2001 by \$1.38. Table 5-8 shows Boxborough's tax rates from 1987 to 2001. Approximately one-quarter of all tax revenue comes from non-residential sources. From FY1996 to FY 2001 the percentage of non-residential tax revenue was less than 20%.

Table 5-8: Boxborough's Tax Rates, 1990-2001

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Rate	11.60	11.40	13.75	14.60	16.90	17.60	18.80	17.00	18.50	17.66	16.88	15.50	15.47

Source: Boxborough Town Reports and Town Administrator

Conclusion

The primary economic development goal is to encourage business development that is appropriate for Boxborough. Throughout this planning process, it has been apparent that Boxborough favors limited economic development. Because one of the major concerns is the protection of the scenic character of Route 111, Boxborough does not want strip commercial development. The preferred location for development is along the edges of

town, proximate to Route I-495 and Route 2, and in the Town Center District Boxborough has indicated that commercial uses serving local, not regional, needs, are desirable. The type of development presently occurring with Cisco Systems is considered appropriate for Boxborough because it will yield a large amount of tax revenue, helping the town to balance the tax revenues from residential and commercial development, while being developed in an environmentally sensitive way that protects in perpetuity 154 acres of significant resource areas. Large-scale office or research and development are preferable to large-scale retail or industrial developments in Boxborough. This is consistent with Boxborough's location along I-495, which is emerging as a technology corridor. Specific action items that promulgate these goals and objectives are detailed in Chapter XI, Acting on the Vision.

CHAPTER 6

NATURAL AND CULTURAL RESOURCES

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NATURAL AND CULTURAL RESOURCES

INTRODUCTION

The natural and cultural resources of Boxborough help define the community and character of the town. While the value of these resources may not be easily quantified, they are clearly a part of the reason that those who live here want to stay and why others decide to make Boxborough their home. The sense of community, historical places, and openness of the landscape are qualities that residents associate closely with and are integral to Boxborough's community character. The underlying topography, geology and soils dictate the shape of the land and its fertility for farming. The ridgelines and hills provide scenic vistas and valleys and wetlands provide habitat for plant and animal species as well as flood storage areas. Because Boxborough has no municipal water or sewer system, groundwater recharge and water quality are critical issues. With the continuous loss of undeveloped land, communities have begun to recognize the many functions that open space serves. This chapter summarizes Boxborough's natural resources and the growing struggle between preservation and development.

GOALS AND OBJECTIVES

Goal	Preserve Boxborough's heritage and rural character.
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Objective Protect Boxborough's scenic resources.

Objective Protect Boxborough's agricultural resources.

Objective Provide incentives for renovation of the town's buildings.

Goal	Protect the natural landscape and resources.
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Objective Protect the town's water supply.

Objective Ensure that development complements the town's natural resources; "green planning."

Objective Protect natural resources and open spaces.

NATURAL RESOURCES

Topography, Geology and Soils

Geology and Topography

The Town of Boxborough is spread over four USGS Topographic Maps: Ayer, Hudson, Maynard, and Westford Quadrangles (Figure 6-1). The advancing and receding glaciers in New England formed Boxborough's topography over 10,000 years ago, creating a series of hills and broad valleys with considerable wetlands. The elevation throughout the town varies ranging from 206± feet above sea level to nearly 470 feet. The most prominent topographic feature is a ridgeline that roughly follows Hill Road from the Littleton town line to Middle Road. The ridgeline splits into three fingers approximately at Picnic Street and Hill Road: one follows Picnic Street, one follows Hill Road, and the third and westernmost ridge parallels Interstate 495. The three fingers have elevations of 455, 458.7, and 468.4 feet above sea level west to east. These three points are among the highest points in Boxborough; Flagg Hill rising 465.4 feet above sea level in the southeast corner of town (Figure 6-2) is another high point.

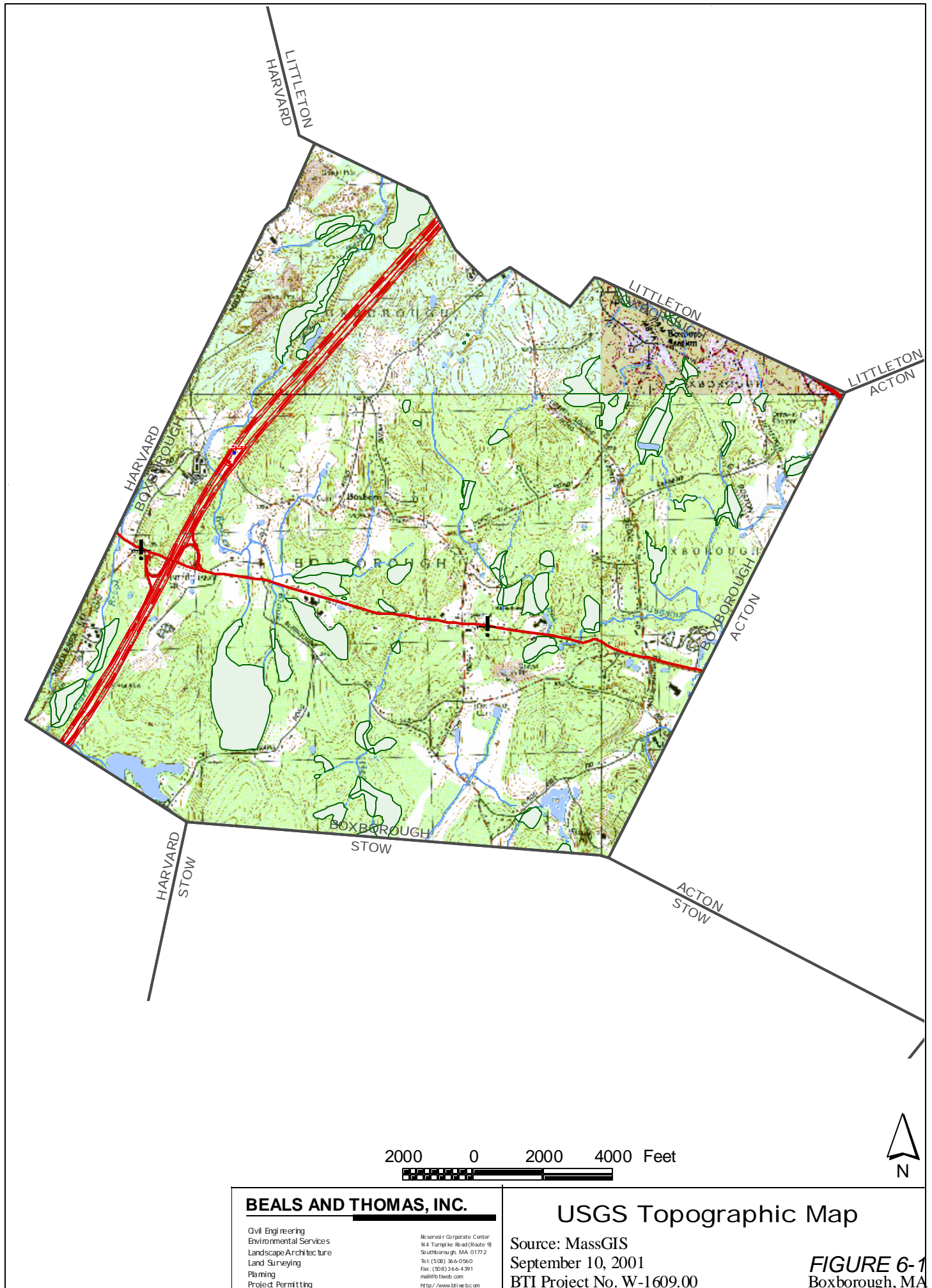
The middle ridge is the center of town and the site of the first meetinghouse and first Town Hall. Both have since been destroyed, but the Old North Cemetery and Old Town Common still occupy the site.

The western ridge runs parallel to Interstate 495 sloping downward towards Beaver Valley and Beaver Brook. The most prominent geological formation in town, known as the Boxborough Esker or Ridge Hill, is located near here between Beaver Brook and Interstate 495. The esker is a long narrow ridge formed of gravel by a stream flowing within the glacier that covered the area over 15,000 years ago. The Boxborough esker is 2.5 miles long and at its peak rises over 45 feet from the valley, making it one of the best examples of a preserved esker in New England. The landscape in the remainder of the town generally slopes downward from the ridgelines in the northwest with lower elevations to the south and east.

Soils

Figure 6-3 shows that the surficial geology in Boxborough can be classified as two-thirds till or bedrock and one-third sand and gravel. There are three general soil associations that can be found in Boxborough, which include glacial till (Paxton-Hollis-Woodbridge), sandy soils (Hinckley-Deerfield), and hydric soils (Muck-Whitman). The Paxton-Hollis-Woodbridge soil association makes up 54%, comprising the majority of Boxborough's underlying soil types. These are soils that have been compacted by the glacial ice and are characteristically dense with slow percolation rates. Because of their seasonal high water table or dense hardpan layer, steep slopes, and shallow depth to bedrock, many glacial till soils are constrained for their use in development or construction.

The Hinckley-Deerfield soil association accounts for roughly 20% of the town's soils. These stratified drift or glacial outwash soils were deposited by the glacier meltwater. These soils are well sorted and typically contain sand and gravel deposits. These soils



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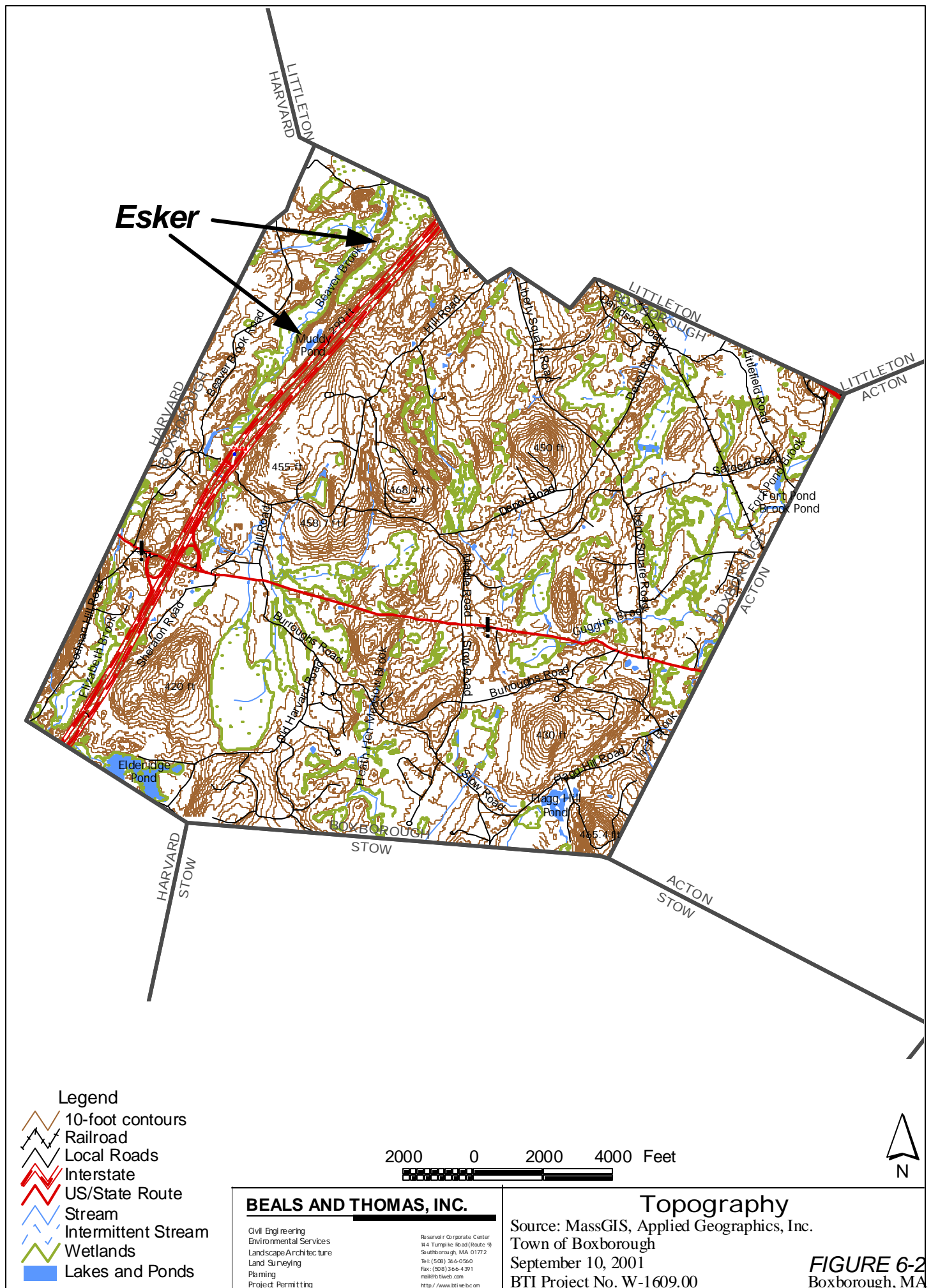
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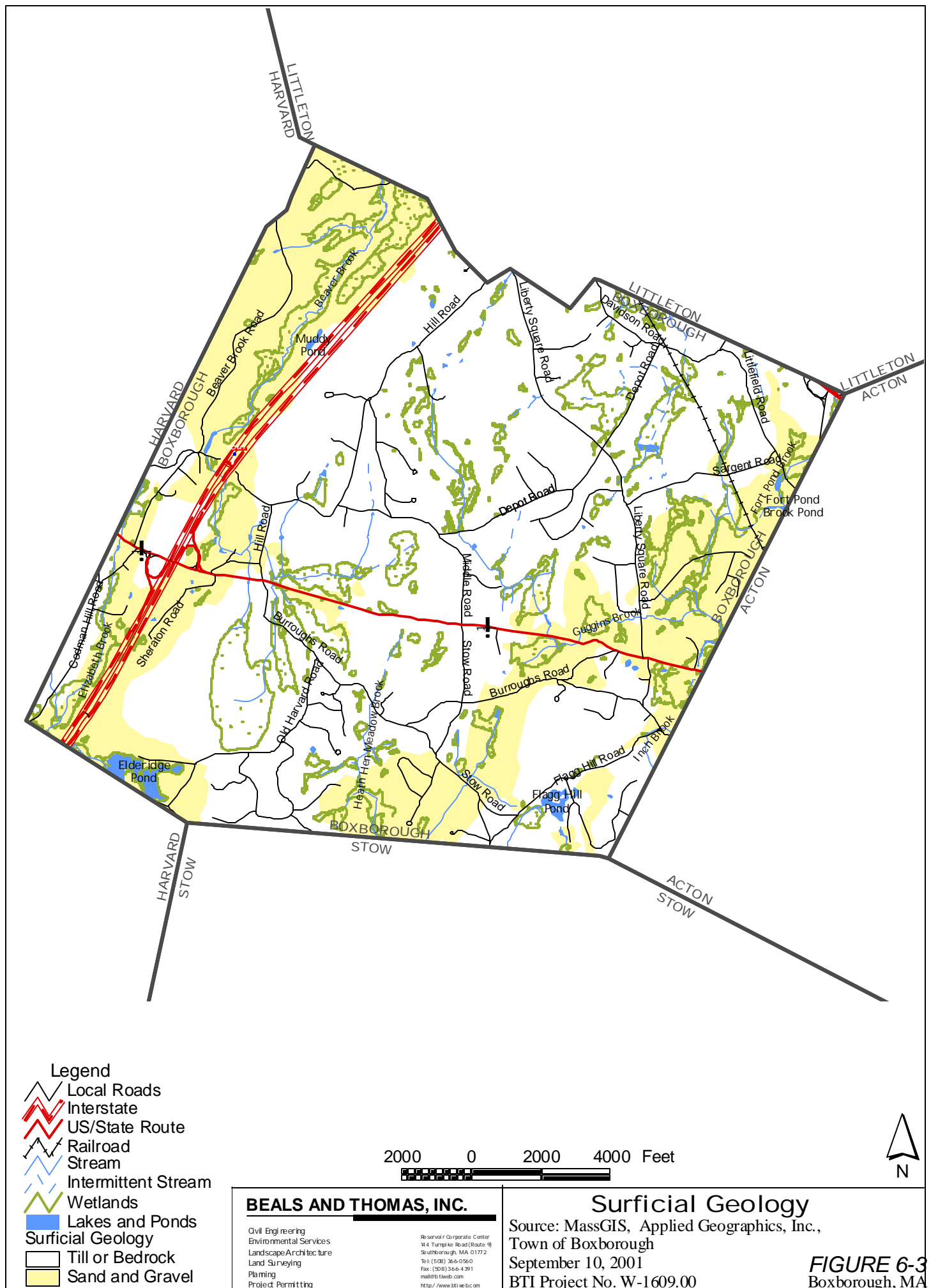
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144 Turnpike Road (Route 9)
Spilltown, MA 01772
Tel: (508) 366-0560
Fax: (508) 366-4391
mail@btweb.com
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USGS Topographic Map

Source: MassGIS
September 10, 2001
BTI Project No. W-1609.00

FIGURE 6-1
Boxborough, MA





tend to be favorable for shallow drinking water wells and generally have few development constraints.

The Muck-Whitman soil association makes up 26% of the town's area. These poorly drained organic soils are associated with wetlands and floodplain areas with the water table at or near the surface during most of the year. These soils are good for wildlife habitat, but their shallow depth to groundwater limits their development.

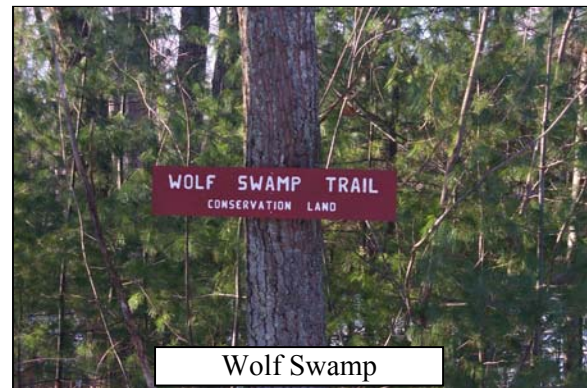
Boxborough has eight soil types classified as prime agricultural soils, including Paxton fine sandy loam, Montauk fine sandy loam, Scituate fine sandy loam, Merrimac fine sandy loam, Sudbury fine sandy loam, Haven silt loam, Sulton fine sandy loam, and Woodbridge fine sandy loam. Prime agricultural soils are those that have the best combination of physical and chemical characteristics for producing sustained high yields of crops when treated and managed. Likewise, Boxborough has seven soil types classified as locally important agricultural soils, including Narragansett very fine sandy loam, Quonset loamy sand, Montauk fine sandy loam (8-15% slope), Scio very fine sandy loam, Hinckley loam sand, Merrimac fine sandy loam (8-15% slope), and Windsor sandy loam. Locally important agricultural soils do not meet the requirements for prime farmland, but are of statewide importance for producing crops.

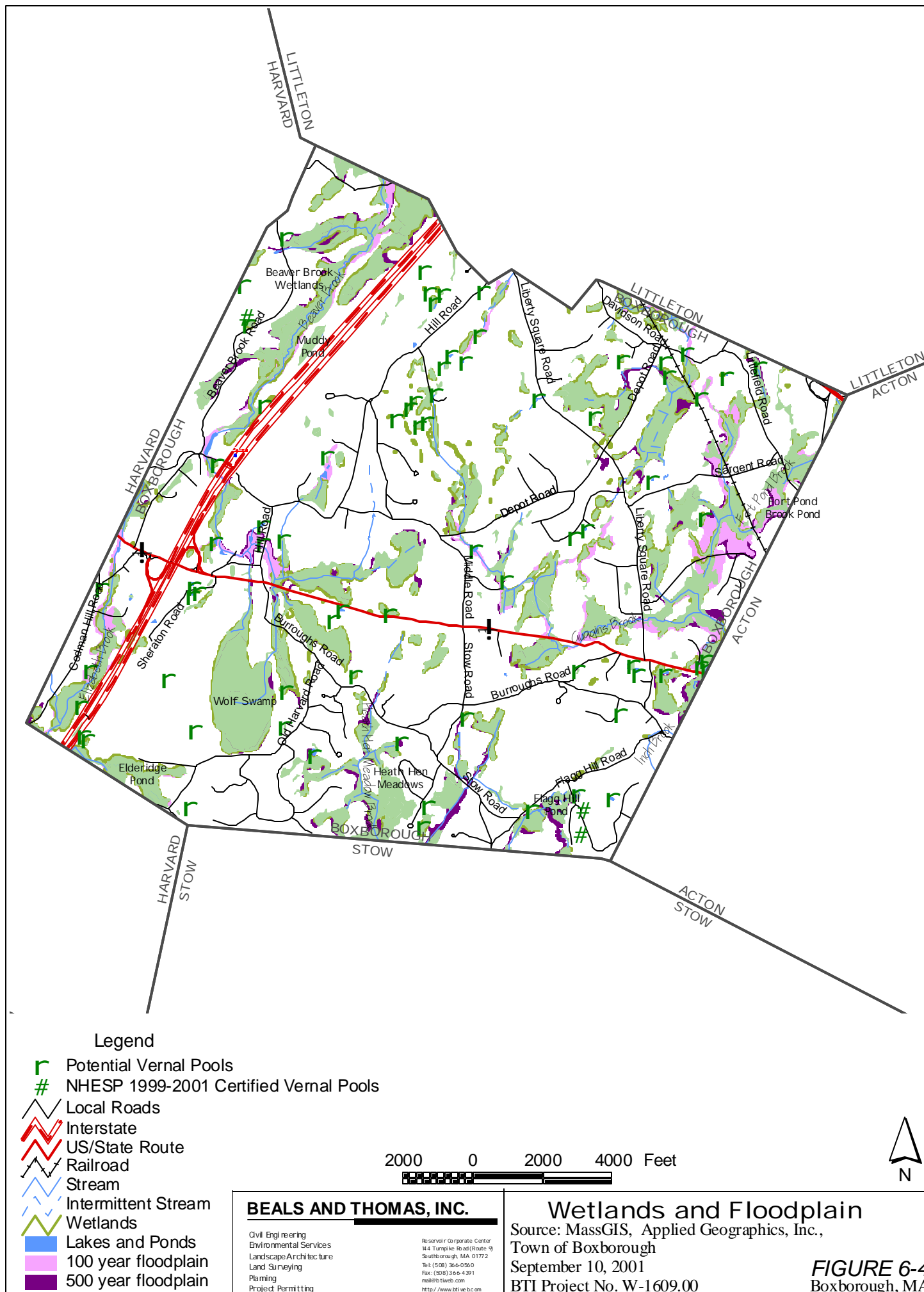
Water Resources

Wetlands and Floodplains

The Federal Emergency Management Agency has identified several flood hazard areas within Boxborough as shown on Figure 6-4. The flood hazard area is the estimated lateral extent of floodwaters resulting from a statistical 100-year or 500-year storm. Flood hazard areas within the Town of Boxborough are identified on four Flood Insurance Rate Maps (FIRM). The FIRM maps designate areas of flooding and estimate the base flood elevation for each zone. These maps are a good indicator of lands subject to flooding during severe storms; however, there may be other low-lying areas susceptible to flooding that are not identified on the FIRM maps.

Wetlands, covering roughly 17% of Boxborough, are distributed evenly and are associated with waterways and drainage patterns throughout the town. Wetlands within Boxborough are identified on Figure 6-4. Larger wetland areas include Wolf Swamp and Heath Hen Meadows in the southern end of Boxborough and Beaver Brook Wetlands in the northwest corner of town. Wetlands play an important role in the natural environment by absorbing rainfall, effectively reducing runoff and protecting upland or downstream areas from flooding. They provide habitat for a wide variety of plant and animal species. The soils and plant species present in wetlands remove nutrients,





bacteria, and some chemicals from the water, acting as a natural filter. These resource areas, however, require proper management, which must be performed in compliance with wetlands regulations to successfully protect the functions that wetlands offer, or they must be left wild. Wetlands and Floodplains are regulated under the Massachusetts Wetlands Protection Act and the Town of Boxborough Wetlands Bylaw. Boxborough's Zoning Board of Appeals administers the Boxborough Wetland Zone Overlay District and the Flood Plan Overlay District.

Vernal Pools

Vernal pools are confined depressions in the landscape lacking permanent outlets above ground. They typically hold water for a minimum of two months during the spring and/or early summer filling with meltwater and runoff of winter and spring snow and rain. With low dissolved oxygen levels, vernal pools are free of fish populations, but provide essential breeding habitat for a variety of amphibian species and are important habitat for other wildlife species as well.

According to the Natural Heritage and Endangered Species Program (NHESP) of the Massachusetts Division of Fisheries & Wildlife, there are 73 potential vernal pools and three certified vernal pools in Boxborough⁴ (Figure 6-4). Two of the certified vernal pools are near Flagg Hill Pond in the southeastern corner of town and one is off Beaver Brook Road near the Harvard town line. Certification is obtained through approval by the Natural Heritage and Endangered Species Program of the Massachusetts Department of Fisheries and Wildlife. Once certified, the vernal pool receives some protection under the Massachusetts Wetlands Protection Act. Protection of potential (non-certified) vernal pools is at the discretion of the local conservation commission on a case-by-case basis. Vernal pools are regulated under the local Wetlands Protection Bylaw.

Surface Water

One-third of Boxborough is located within the Merrimack watershed, while the remaining two-thirds lies within the Concord watershed. Drainage flows out of Boxborough in all directions, thus land use decisions in Boxborough affect the adjacent towns of Stow, Acton, Littleton, and Harvard. All of Boxborough's brooks eventually drain into the Merrimack River in the northern part of the state. There are six brooks within Boxborough, each with its own drainage basin: Beaver Brook, Elizabeth Brook, Guggins Brook, Heath Hen Meadows Brook, Fort Pond Brook and Inch Brook (Figure 6-5).

There are no large lakes or ponds within Boxborough, but there are several ponds that provide habitat for wildlife as well as recreational opportunities for the community: Flagg Hill Pond is the largest at roughly 12 acres. Other ponds include Elderidge Pond (±2 acres), Muddy Pond (±1 acre), and Fort Brook Pond (±1 acre). Additionally,

⁴ Information downloaded from the MassGIS website. The 1999-2001 version of the datalayer shows all pools that were certified as of June 30, 1999. Potential vernal pools visible on aerial photographs were interpreted and included in this layer. However, this datalayer does not include every vernal pool in Massachusetts.



Boxborough has several fire ponds ranging from 60,000 to 2 million gallons as part of a town-wide fire protection system.

Aquifers and Water Supply

There are four significant sand and gravel aquifers within the Town of Boxborough that were delineated by Geoscience (IEP) in 1981 as part of a analysis of groundwater supply as listed in Table 6-1. These aquifers are further shown on Figure 6-5.

Table 6-1: Major Surficial Aquifers in Boxborough		
Aquifer Name	Area (sq. mi.)	Recharge (million gpd)
Guggins Brook	4.29	1.32
Beaver Brook	3.40	1.41
Elizabeth Brook	2.25	0.79
Heath Hen Meadows Brook	1.50	0.49

Boxborough does not have a municipal water supply, nor are any of its ponds large enough to serve as public water supply reservoirs. Therefore, businesses and residences alike depend on wells for their water needs. Two-thirds of the town depends on private wells within bedrock fractures and the remaining one-third draws water from one of the aquifers. In order to protect the aquifers and the future of the town's water supply, an Aquifer Overlay Zoning District Bylaw was implemented in 1984 to limit uses that might harm the water supply. Additionally, Boxborough requires the installation of groundwater monitoring wells for all new developments requiring Site Plan Approval. These are two ways that Boxborough is helping to ensure that its water supply is safe for future generations.

In addition to private wells servicing private businesses and individual residences, there are 43 public wells located in Boxborough, which service condominiums or public facilities. Eighteen of Boxborough's wells are classified as community groundwater wells. These wells are typical in condominium or apartment complexes and by definition service at least fifteen connections used by year-round residents or serve at least 25 year-round residents. Twenty-one wells, classified as non-transient non-community, are public water supplies that service at least 25 of the same people four or more hours per day for more than six months of the year. These wells are typical of businesses that provide water to their employees, such as the Holiday Inn or Cisco Systems along Massachusetts Avenue. Four wells are classified as transient non-community wells in Boxborough. These differ from the non-transient non-community wells in that they service 25 different people for at least 60 days per year. Transient non-community wells in Boxborough include the Exxon Station and Nashoba Valley Olympia, which service the public, but not the same people every day.

Every public water supply well has a water supply protection area associated with it, limiting certain activities such as landfills, storage of hazardous materials, fertilizers, earth removal within four feet of high groundwater, and other activities potentially

harmful to the water supply. In some cases the protection area is a Zone II, which is determined by calculating the area of the aquifer that contributes water to the well under the most severe pumping and recharge conditions. In cases where the Department of Environmental Protection has not yet approved a Zone II, an Interim Wellhead Protection Area (IWPA), proportional to the pumping rate of the well, is used. If the pumping rate is unknown, a default radius is used: 1/2 mile for community class groundwater wells, 750 feet for non-transient non-community and 500 feet for transient non-community wells. Wells and their protection areas within Boxborough are shown on Figure 6-5.

Vegetation and Wildlife


Boxborough contains a mixture of natural landscapes including mixed hardwood and softwood forests, open fields and meadows, wetlands, watercourses and developed areas. Of particular interest is the “Cathedral of Trees” creating an archway over Route 111. Boxborough also has 23 parcels of forestlands totaling nearly 400 acres that are managed under the state forestry programs (Chapter 61). Chapter 61 forestlands are discussed further in Chapter 7.

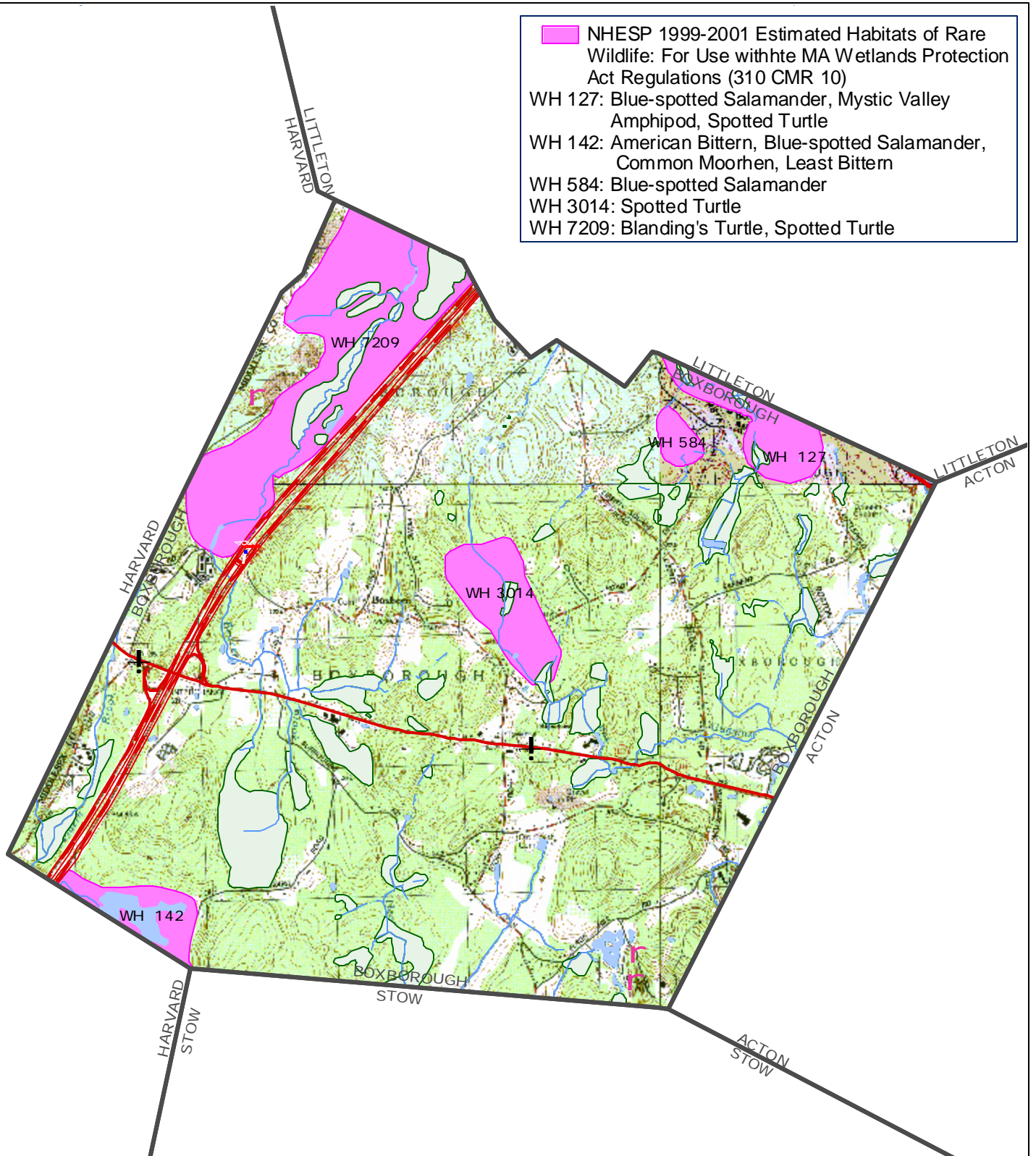
Forest lands and other natural habitats provide food, cover, and nesting areas for wildlife. Though no formal wildlife survey has been completed in Boxborough, various reports have identified the following mammals in town: moose, shrew, gray fox, mouse, eastern cottontail, eastern chipmunk, gray squirrel, red fox, raccoon, long-tail weasel, white tail deer, ground hog, fisher, beaver, otter, mink, red squirrel, opossum, skunk, coyote, and numerous bird species.








Associated with the many wetlands in Boxborough are several areas of Estimated Habitats of Rare Wildlife, which are regulated under the Massachusetts Wetlands Protection Act (310 CMR 10.00). These areas have been identified by the Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program as containing one or more species officially listed as endangered, threatened or of special concern in Massachusetts (Figure 6-6). Seven species are listed among five habitat areas in Boxborough as outlined in Table 6-2.

Table 6-2: Rare Species in Boxborough				
Common Name	Latin Name	Taxon	Status	Habitat Area(s)
American Bittern	<i>Botaurus lentiginosus</i>	Bird	Endangered	WH 142
Blanding’s Turtle	<i>Emydoidea blandingii</i>	Reptile	Threatened	WH 7209
Blue-spotted Salamander	<i>Ambystoma laterale</i>	Amphibian	Special Concern	WH 127, WH 142, WH 584
Common Moorhen	<i>Gallinula chloropus</i>	Bird	Special Concern	WH 142
Least Bittern	<i>Ixobrychus exilis</i>	Bird	Endangered	WH 142
Mystic Valley Amphiphod	<i>Crangonyx aberrans</i>	Crustacean	Special Concern	WH 127
Spotted Turtle	<i>Clemmys guttata</i>	Reptile	Special Concern	WH 127, WH 3014, WH 7209

The three bird species listed include the endangered American bittern (*Botaurus lentiginosus*), the endangered least bittern (*Ixobrychus exilis*), and the state special concern common moorhen

 NHESP 1999-2001 Estimated Habitats of Rare Wildlife: For Use with the MA Wetlands Protection Act Regulations (310 CMR 10)
 WH 127: Blue-spotted Salamander, Mystic Valley Amphipod, Spotted Turtle
 WH 142: American Bittern, Blue-spotted Salamander, Common Moorhen, Least Bittern
 WH 584: Blue-spotted Salamander
 WH 3014: Spotted Turtle
 WH 7209: Blanding's Turtle, Spotted Turtle



- Legend**
-  Interstate
 -  US/State Route
 -  Railroad
 -  Stream
 -  Intermittent Stream
 -  Wetlands
 -  Lakes and Ponds

2000 0 2000 4000 Feet



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 Southborough, MA 01772
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 Fax: (508) 366-4391
 mail@btweb.com
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Estimated Habitats of Rare Wildlife

Source: MassGIS, NHESP
 September 10, 2001
 BTI Project No. W-1609.00

FIGURE 6-6
 Boxborough, MA

(*Gallinula chloropus*). The American Bittern is a medium-sized ground-dwelling heron, which spends most of its time hidden among marshland vegetation. These birds have short thick necks with a black patch on either side and are mottled brown and buff on top with brown and white streaked undersides. The least bittern is the smallest member of the heron family (11-14") and lives in freshwater marshes where cattails and reeds predominate. Least bitterns are chestnut and buff colored with black and green heads. The common moorhen is a duck-like bird just over a foot long and inhabits large freshwater marshes and ponds with cattails. They are dark gray with a prominent red bill with a yellow tip.

There are two listed reptiles, the threatened Blanding's Turtle (*Emydoidea blandingii*) and the state special concern spotted turtle (*Clemmys guttata*). The Blanding's Turtle is medium sized with a long neck and a high domed shell exhibiting yellow spots and streaks. They are primarily aquatic, preferring densely vegetated shallow ponds, marshes, and small streams. The spotted turtle is a small turtle often displays bright yellow round spots covering its black shell, however, some turtles of this species lack spots altogether. Spotted turtles inhabit wetland habitats such as marshy meadows, bogs, small ponds and brooks, ditches, and other shallow unpolluted bodies of water.

The only amphibian listed is the special concern blue-spotted salamander (*Ambystoma laterale*). The blue-spotted salamander is characterized by dark blue to black dorsal pigmentation with much lighter ventral pigmentation and bright blue spots on the lower part of their body. They are typically found in northern hardwood forests and rely on vernal pools for breeding. The Mystic Valley Amphipod is the only crustacean in Boxborough listed as a state special concern species. They are endemic to southeastern New England and found in lowland aquatic habitats especially red maple and white cedar swamps. They have 14 body segments with paired segmented appendages. The females are vivid greenish blue in color and typically 7-10mm in length. Males are orange-brown in color and slightly smaller and thinner than the females (5-6.5mm).

Environmental Threats

Natural resources must be protected against both natural and man-created harms. For example, while agriculture is a traditional way of life, and an important value to the Boxborough community, agricultural practices and single-family homes can be harmful to the land. Management plans are needed to ensure that fertilizers for crops and animal waste don't contribute to the pollution of water resources. Though there are no known point discharges of pollutants, small "non-point" discharges from a variety of activities are a constant contributor to overall pollution. As development continues within Boxborough, managing pollutant sources becomes more challenging and more important to maintain the integrity of the town's water supply and other resources.

The most significant harms in terms of impact to critical resources, is the potential threat caused by human activities. A common example is the leaking underground storage tank (UST) of heating oil or commercial petroleum products. USTs are an issue on residential properties as well as in commercial locations. Recent trends and environmental regulations have caused new tanks to be placed above ground within the building, or alternatively, by requiring double walled tanks with monitoring devices to minimize the risk to the environment. Another potential threat is failing septic systems. Excess nutrients, pathogens, and other wastewater constituents such as

detergents can contaminate the surface water and groundwater within their drainage area, the very same resources on which the town depends for its drinking water.

Boxborough has experienced some "21E" activity (Table 6-3). Massachusetts General Laws Chapter 21E and its associated regulations, known as the Massachusetts Contingency Plan (MCP), provide stringent rules related to identifying, reporting, and clean up of hazardous materials. Luckily, the list for the last decade is relatively short. Additionally, it should be noted that Massachusetts has stringent regulations related to the construction of USTs and hazardous waste storage facilities near sensitive resources such as water, wetlands and streams. These land use "siting" regulations combined with the aggressive MCP program serve a protective role to Boxborough's cherished resources.

To date, the release of hazardous materials has not had a profound effect on the town, although sometimes such a release creates a perception problem in the eyes of the real estate community.

Table 6-3: Hazardous Materials Releases				
Release Tracking #	Location	Date	Status*	
2-0000026	1425 MASS AVE	B&F EXXON STATION	1/15/87	Open
2-0000412	SUMMER RD	JOYCE INDUSTRIAL PARK	7/15/88	Open
2-0000928	WHITCOMB AVE	CHU ASSOCIATES INC	10/15/92	Closed
2-0010134	SWANSON RD	MHD FACILITY 30	12/28/93	Closed
2-0010209	STOW RD	NE OF MINUTE AIR FLD	2/28/94	Closed
2-0010349	1425 MASSACHUSETTS AVE	EXXON STATION	6/22/94	Closed
2-0010405	62 MASSACHUSETTS AVE	NASHOBA VLY OLYMPIA SKATING RINK	8/2/94	Closed
2-0010927	34 MASSACHUSETTS AVE	NASHOBA VLY OLYMPIA	9/22/95	Closed
2-0010986	SWANSON RD	MHD FACILITY 30	11/3/95	Closed
2-0011582	871 MA AVE	871 MA AVE	1/24/97	Closed
2-0011738	1425 MA AVE	EXXON STA	5/27/97	Closed
2-0012292	RTE 495	OFF RAMP EXIT 28	7/9/98	Closed
2-0012431	SWANSON RD	MHD FACILITY 30	9/30/98	Closed
2-0013186	RTE 495	RTE 495 S @ EXIT 28	3/7/00	Closed
2-0013306	LITTLETON COUNTY RD	MAP 4 LOT 173.17A	5/22/00	Open
2-0013332	MASSACHUSETTS AVE	ROADWAY RELEASE	6/16/00	Closed

2-0013382	81 CUNNINGHAM RD	NEW BLUE HILLS SAUGUS REALTY TRUST	6/30/00	Open
2-0013430	60 CODMAN HILL RD	ENNOVATE INC	8/14/00	Closed
2-0013496	RTE 495	RTE 495 S	9/26/00	Open
2-0013716	1425 MASSACHUSETTS AVE	EXXON STA	3/9/2001	Closed
2-0013743	1146 MASSACHUSETTS AVE	JF LOMMA TRUCKING INC	3/22/01	Closed
2-0013783	1425 MASSACHUSETTS AVE	FMR EXXON STA	4/16/01	Open

* Closed = Cleaned-up to safe background levels. Open = further action required.

Source: DEP Bureau of Waste Site Cleanup Site/Reportable Releases Database, August 1, 2001

CULTURAL RESOURCES

Agricultural Resources

Farming is an important part of Boxborough's history as it was the primary source of welfare during the early settlement. As of January 2001, 25 parcels totaling over 400 acres were taxed as Farm and Forest under the Assessment Taxation of Agricultural and Horticultural Land, known as Chapter 61A. Some of these farms include the Richardson Farm, the Morse Farm and the Sheehan property. Chapter 61A lands are further discussed in Chapter 7. Aside from land in the Chapter 61A program, Steele Farm was identified as an important agricultural resource. This expansive scenic farm is owned by the town and located to the south of the intersection of Middle Road and Picnic Street. Steele Farm also contains a historical house and barn and a reconstructed ice house.



Steele Farm

Scenic Resources

Scenic resources need not be a specific view or location, but may be a combination of features that come together to create an aesthetically pleasing situation, such as a tree lined street, old stonewalls, a rolling meadow, a hilltop, or an old farmhouse. With growing development and the loss of open land, these features become scarcer increasingly important as they contribute to the town's overall character and provide links buffers to increased development. The community identified the following as scenic and unique resources.

- Flagg Hill Land
- Half Moon Meadow
- Steele Farm
- Wolf Swamp
- Hager Land
- Grady Land
- Sheehan Land
- Boxborough Esker
- Tree canopy along Route 111
- Old Carriage Road

- Flerra Land
- Rolling Meadows
- Old Lime Quarry on Robinson Conservation land
- Horse pastures on Hill Road

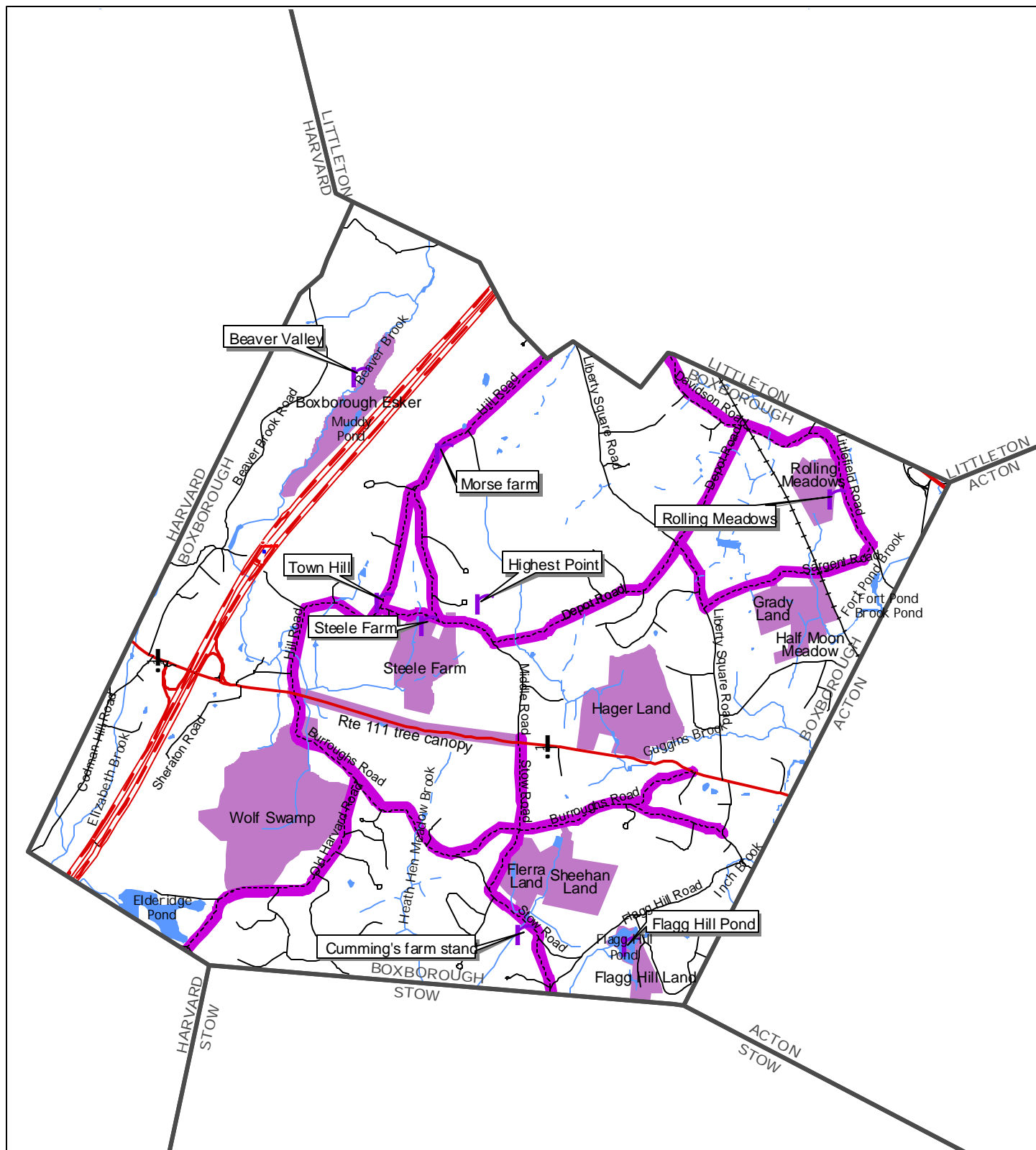
The Scenic Roads Act (M.G.L. Chapter 40, section 15C) allows a municipality to designate any non-numbered route as a “scenic road.” Once designated, any proposed repair, maintenance, reconstruction, or paving work that involves the cutting of trees or destruction of stonewalls needs prior approval of the Planning Board. Designating a road as scenic allows for the preservation of existing rural and natural aesthetic qualities, thereby contributing to the overall rural character of a community. Boxborough passed a scenic road bylaw on February 3, 1975 and has designated the majority of its roads as scenic including: Burroughs Road, Hill Road, Old Harvard Road, Davidson Road, Depot Road, Sargent Road, Liberty Square Road between Depot and Sargent Roads, Littlefield Road between Sargent and Depot Roads, Middle Road between Hill and Depot Roads, Picnic Street, Stow Road from Route 111 to the Stow town line and Pine Hill Road. Boxborough’s scenic areas and roads are shown on Figure 6-7.

Historical Resources

Boxborough’s history has had a strong influence on the town’s current patterns of land use and its economy. The historical resources offer a glimpse into the town’s past and an idea of what shaped the community of today. The town’s active farms, expansive woodlands and rural character are a direct reflection of its early settlement patterns. Since its incorporation over 200 years ago, these features have defined the community’s quality of life. Though there are no properties listed on the National Register of Historical Places, several historical sites have been identified by the community. The Town of Boxborough Historical Commission has inventoried the resources in town including houses and home sites, mill sites, and town historical areas. This is not an official inventory. The Commission obtained approval for funding of such a study to develop historical inventory in accordance with Massachusetts Historical Commission standards at the November 2001 Special Town Meeting. Some of Boxborough’s historical resources are shown on Figure 6-8. The complete inventory compiled by the Boxborough Commission is included as Appendix 6-1.

Historical Sites

Families in Boxborough during the early years relied primarily on self-sufficient farming as a source of welfare. Probably growing out of the farmers’ need for storage barrels, cooper shops sprang up in Boxborough. Boxborough’s abundant forests also gave rise to many sawmills. In 1860, Henry David Thoreau described one such 400-acre forest (Inches Woods) as “the most remarkable and memorable thing in Boxborough.” Unfortunately, just a few years later, most of the grand oaks were cut down and sold as ship timber.



Legend

- Scenic Vistas
- 150 ft Scenic Road Buffer
- Scenic Areas
- Scenic Roads
- Local Roads
- US/State Route
- Interstate
- Railroad
- Stream
- Intermittent Stream
- Wetlands
- Lakes and Ponds

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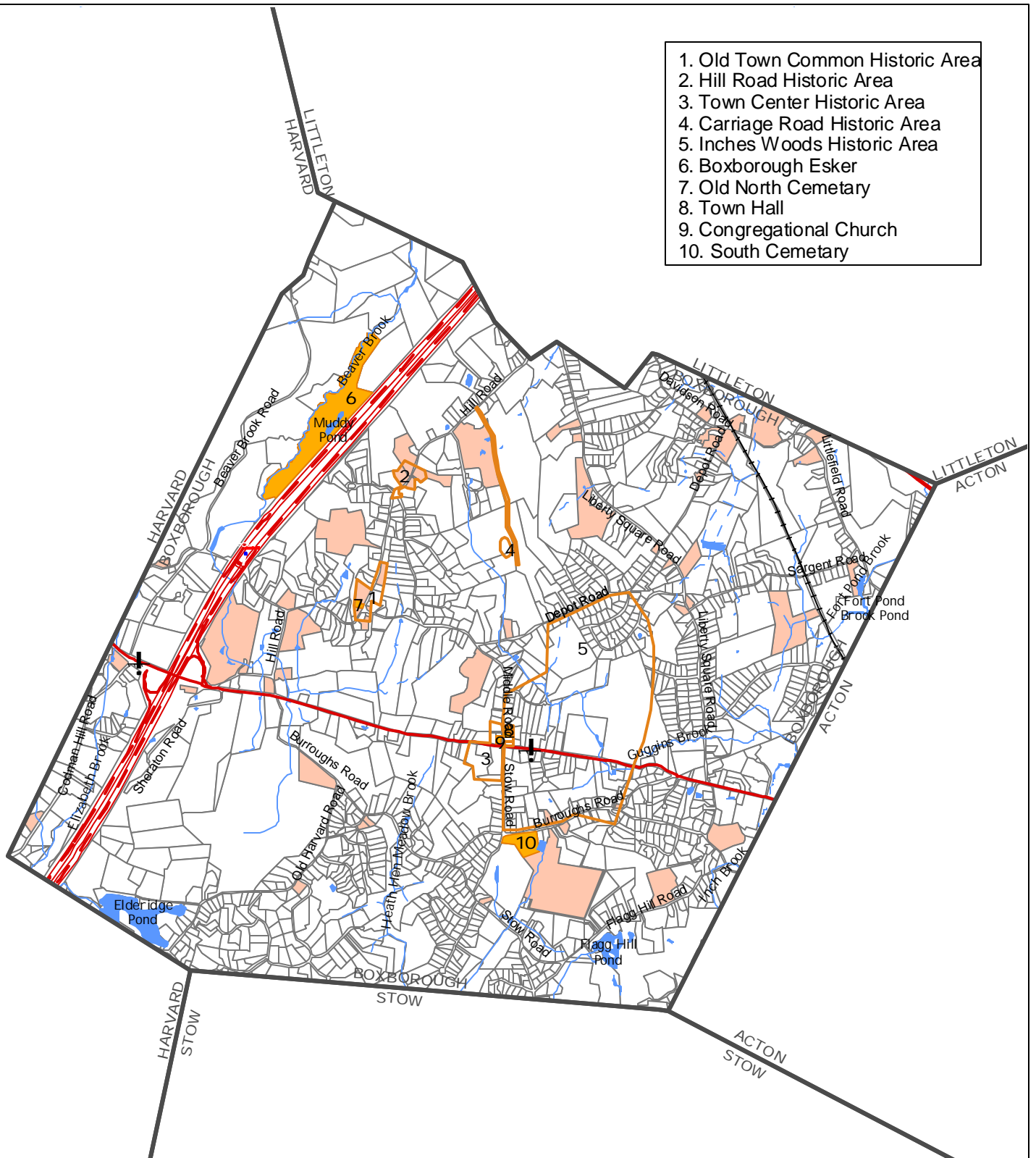
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Scenic Resources

Source: MassGIS, Town of Boxborough
September 10, 2001
BTI Project No. W-1609.00

FIGURE 6-7
Boxborough, MA

1. Old Town Common Historic Area
2. Hill Road Historic Area
3. Town Center Historic Area
4. Carriage Road Historic Area
5. Inches Woods Historic Area
6. Boxborough Esker
7. Old North Cemetary
8. Town Hall
9. Congregational Church
10. South Cemetary



Legend

- Historic mill sites
- Potential Historic Districts
- Historic Areas
- Parcels with homes built before 1900 or those with detailed historic survey inventory sheets
- Interstate
- US/State Route
- Railroad
- Stream
- Intermittent Stream
- Wetlands
- Lakes and Ponds

BEALS AND THOMAS, INC.

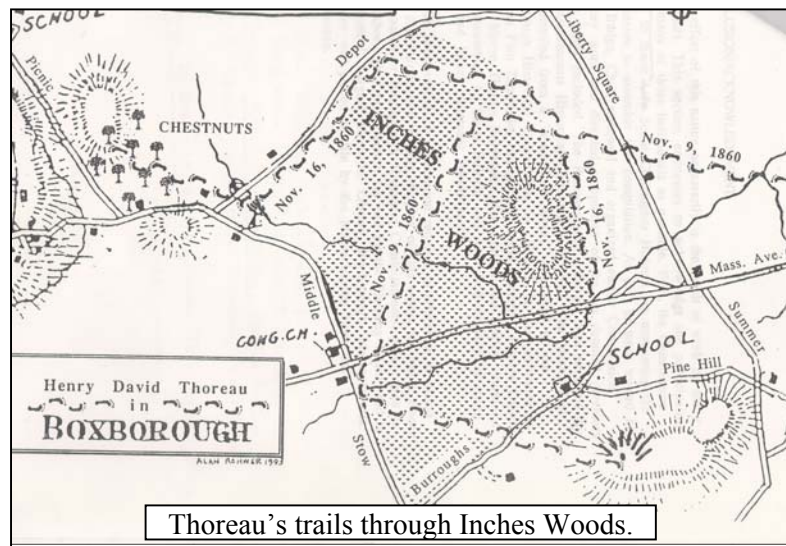
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Historic Resources

Source: MassGIS, Applied Geographics, Inc.,
Town of Boxborough
October 2, 2001
BTI Project No. W-1609.00

FIGURE 6-8
Boxborough, MA

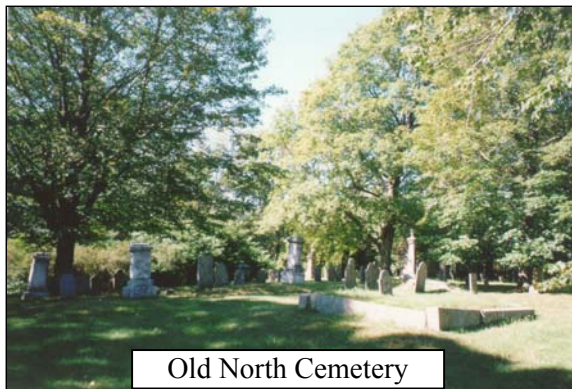


Source: Town of Boxborough Commission Draft Historical Inventory Preliminary Report.

The town has identified one hundred homes and home sites plus five mill sites, many belonging to the early settlers and farmers. The sites are distributed throughout town, though there are a great many of them along Hill Road. This extensive list illustrates the pride of the community in their heritage.

Historical Areas

Five historical areas have been identified as showing potential for listing on the National Register including: Historical Town Center, a cluster along Hill Road including Schoolhouse #2, Thoreau's trails (Inches Woods), Old Carriage Road and Archaeological Site and the Town Center recently protected under special zoning provisions. These



areas have been recognized for their unique historical value and as potential local historical districts deserving some consideration during the planning process. M.G.L. Chapter 40C allows towns to designate local historical districts. In order to create a local historical district several more steps would be needed including drafting a historical district bylaw, preparing and submitting a preliminary report to the Planning Board

and the Massachusetts Commission, holding a public hearing, preparing a final report, voting at Town Meeting (approval by two-thirds), enactment of the Historical By-law by the Attorney General, recording the historical district map at the Registry of Deeds, appointment of the Historical District Commission, and notice of the district establishment. A request from the town to fund an Historical Inventory per Massachusetts Historical Commission standards was approved at the November 2001 Special Town Meeting.

The historical center of town lies at the top of Hill Road at its intersection with Middle Road. The first meetinghouse was constructed here, but has long since been destroyed.



However, there are still a number of historical houses, a small common, and the Old North Cemetery that make up this proposed historical area.

Other historical resources in town include the four original schoolhouses. Three of the four have since been converted to private residences, but Schoolhouse #2 (seen on the left) has been renovated and is still standing near the intersection of

Picnic Street and Hill Road. Schoolhouse #2 along with a cluster of other historical houses forms the second historical area along Hill Road.

The third area is the Town Center Historical Area at the intersection of Middle Road and Stow Road with Route 111. This area includes Town Hall, the Congregational Church, a few other historical houses and a large area of open land recently zoned Town Center in an effort to create a town center area and direct development away from Route 111. The Town Center Plan is further discussed in the Economic Development Chapter 5.

The old carriage roads and archaeological site make up the fourth historical area. This road was originally constructed to connect Littleton with Stow, but was abandoned shortly after Boxborough incorporated. Today, the path is used as a recreational walking and bridle trail descending from Hill Road southeast towards Depot Road.

The final proposed historical area is Inches Woods, the site of an expansive forest that Henry David Thoreau described as “the most remarkable and memorable thing in Boxborough.” Most of the grand oaks were cut down for ship timber shortly after Thoreau’s visit, but the area is still an important piece of Boxborough’s history. The area spans across Route 111 and is roughly bounded by Depot Road, Liberty Square Road, Stow Road, and Burroughs Road.

ANALYSIS OF SENSITIVE RESOURCES

Natural and cultural resources help define the character of Boxborough. A resource sensitivity analysis was performed to assist Boxborough in rating its existing natural and cultural resources. The results of the analysis can then be used as a mechanism for land acquisition, preservation, or responsible development planning in the future. The rating criteria include those “public interest values” that are important specifically to Boxborough but not necessarily to a developer. Based on community input and results from the Town Survey the following key categories were identified.

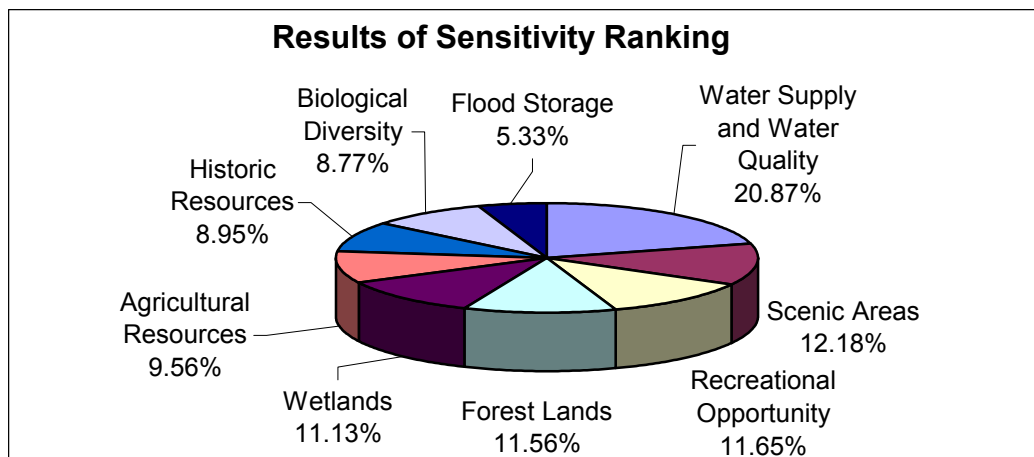
1. Protection of Town Character - (scenic areas, historical areas, agricultural resources, and recreational areas)
2. Protection of Natural Resources - (water supply and water quality, forest lands, wetlands, biological diversity, and flood storage)
3. Contiguity with Existing Open Space Areas
4. Potential Use for Affordable Housing or Other Municipal Needs

The first two categories include items that can be displayed graphically and were used during the first stage of the sensitivity analysis to graphically identify sensitive areas of town. Following the results of the graphical sensitivity analysis, contiguity with existing open space areas and the potential use of the lands for affordable housing or other municipal needs were evaluated to prioritize what areas of town should be developed, protected, or purchased by the town for other services.

Methodology and Results

The evaluation of values was initially presented to the Steering Committee at their January 9th meeting. Each participant was asked to distribute 100 points among the list of values included on the Community Values Worksheet (Appendix 6-2). The worksheet responses were averaged to get a percentage weight for each value. Generally, the Committee ranked water supply and water quality high, about 26% and historical resources and flood storage low, 5% and 7% respectively, with all other values approximately equal. At the first Community Workshop held on February 27, 2001, the citizens of Boxborough were given an opportunity to rank the same values. The results were very similar to those of the Committee, but with slightly less range. The community ranked water supply and water quality lower at 19%, and flood storage lower at 5%. The Committee results were averaged with the community results to determine the percentage values used in the graphical analysis. The raw data are included as Appendix 6-3. The final percentages are shown in Figure 6-9.

Figure 6-9. Results of Sensitivity Ranking. Based on the average of 14 Committee responses and 48 Community responses.



Each community value shown in Figure 6-9 was mapped across the entire town and assigned a value equal to the percentage weight from the town's worksheet responses. The series of maps

were then overlaid to determine how the individual values related throughout Boxborough. For example, flood storage is assigned a value of 5.33% and scenic areas are assigned a value of 12.18%. Therefore, a parcel containing both flood storage and scenic areas will be given a value of 17.51. Water supply and water quality were valued at 20.87%, so a parcel within the water supply and water quality area would automatically have a value of at least 20.87, which is greater than the parcel containing both scenic areas and flood storage. Thus, a parcel exhibiting a single value could have a higher ranking than another parcel exhibiting two values if their sum is valued less than another single value.

Figure 6-10 illustrates the results of this sensitivity analysis, indicating a range of areas valued highest in terms of sensitivity, to those not valued as high. The range of values determining the level of sensitivity was derived from the weighted values listed above. Areas with a low rating exhibit a single value other than water supply and water quality. Areas with a high rating are typically near the water supply and exhibit multiple other values as well. The highest valued areas are in the northwest corner of town around Beaver Brook. This can be attributed to several contributing factors such as floodplain, wetlands, the Zone II for the public water supply, and the Boxborough Esker, which has historical and scenic value and rare habitat areas within the region. Other highly rated areas are parcels with multiple values, such as scenic, recreational, agricultural, historical, or forest value, and those located within a water supply protection or wetland area including, the Hager Land, Wolf Swamp, Grady Land and Half Moon Meadow. Areas with the lowest values are generally located through the center of town from north to south and in the southeast corner because within these regions the community identified no resources.

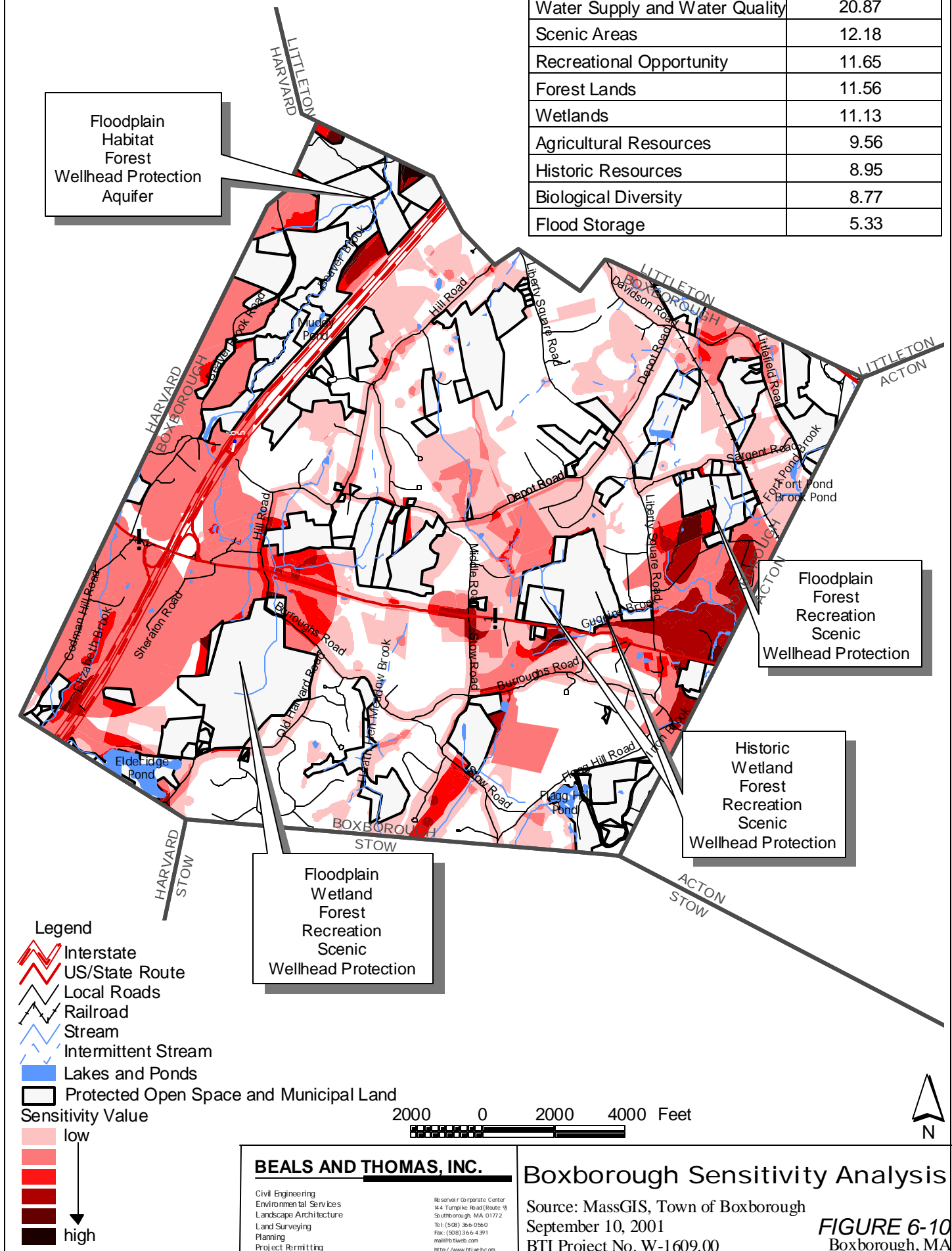
In addition to sensitive areas, Figure 6-10 shows parcels of land already protected as conservation land or parcels already owned by the Town of Boxborough. Connections between the highly sensitive areas and existing open space were examined to develop a land acquisition strategy for the Town of Boxborough. The strategy is outlined in Chapter 7.

Economic Development and Resource Protection

The Resource Sensitivity Analysis indicates areas of town that contain resources that Boxborough desires to protect. Some of the more sensitive areas that appear on the map include the north-west corner of Boxborough, near Harvard and Littleton, and an area to the west of Old Harvard Road. The areas along I-495 zoned for Commercial and Industrial development appear as moderately sensitive.

Some of the more sensitive areas are also located in areas that are appropriate for Industrial and Commercial development, because of the proximity to I-495. Boxborough residents have indicated that development along Route 111 should be limited to protect the scenic nature of that road. The Resource Sensitivity Analysis and the areas available for Commercial and Industrial development are in conflict in these two areas. The greatest weight on the resource sensitivity analysis was given to water supply and water quality. These sensitive areas are therefore important to the protection and preservation of water supply and water quality. Any development that occurs in the area west of I-495 will required careful site plan review, but will not necessarily be prohibited. Cisco Systems, for example, used the Open Space Commercial Development to cluster development into a campus layout. This enabled Cisco to design turtle

Community Value	Percentage Weight
Water Supply and Water Quality	20.87
Scenic Areas	12.18
Recreational Opportunity	11.65
Forest Lands	11.56
Wetlands	11.13
Agricultural Resources	9.56
Historic Resources	8.95
Biological Diversity	8.77
Flood Storage	5.33



crossings to protect the habitat of one rare species. Development and sensitive resources can exist together if careful attention is paid to those resources.

CONCLUSION AND RECOMMENDATIONS

The biggest issue relating to natural resources in Boxborough is the protection of the water supply and water quality. Although the current water supply demands for Boxborough are being met by the existing private wells, there is an overall concern for the water quality and quantity available to residents in the future, especially considering the recent growth in residential development. Currently, Boxborough is undergoing a water study to investigate the need and process of implementing a municipal water supply. Additional recommendations include education about household detergents and environmentally friendly products, and minimizing the use of road salt. The protection of the existing water supply will ensure a high and healthy quality of life in Boxborough for years to come.

Other issues of importance include protecting existing natural, scenic, and agricultural resources that contribute to Boxborough's 'rural' character. Educating the public and implementing protective regulations can ensure that these resources are protected for future generations. For example, educating the public about Chapter 61, 61A, and 61B tax benefits will encourage them to enter these programs, thus protecting additional forest, agricultural, and recreational land. Boxborough can also implement design guidelines with standards for the preservation and replacement of trees and stonewalls to protect scenic roadways and stonewalls, or implement a demolition delay bylaw to encourage preservation of historical structures. Refer to Chapter 11 for a more complete listing of action items and responsibilities.

CHAPTER 7

OPEN SPACE AND RECREATION

Contents

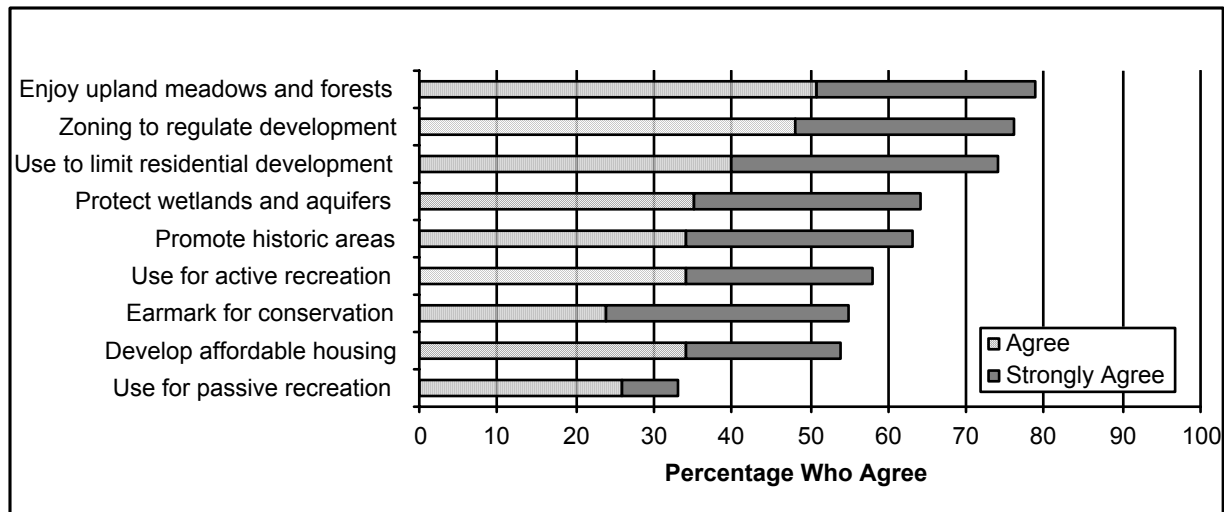
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OPEN SPACE AND RECREATION

INTRODUCTION

As the population in Massachusetts continues to rise, and more and more vacant land is developed, communities are realizing that the loss of open space cannot be easily recovered. Many communities have discovered the value of open space through its loss to development. The 2000 Boxborough Town Survey (Figure 7-1) placed protection of wooded upland, meadows and fields, protection of aquifer recharge areas, protection of wetlands and vernal pools, and active recreation space among the highest priority of uses for land acquisition. Subsequent discussions with the Steering Committee and Boxborough community have also identified the loss of open space as a major concern.

Figure 7-1. 2000 Boxborough Town Survey – Land Acquisition.



Open space refers to a mixture of public, semi-public, and private lands with varying levels of protection. The Town of Boxborough completed an Open Space and Recreation Plan in October 1997, which evaluated the town's future open space and recreational needs. This chapter of the master plan builds on the work that was completed in 1997 for the Open Space and Recreation Plan (OSRP) to assess the existing resources and evaluate open space and recreation in terms of the master plan. Furthermore, this chapter will aim to prioritize areas for protection and focus

land acquisition and management on the most desirable parcels for open space, affordable housing, or water supply protection.

GOALS AND OBJECTIVES

Goal	Acquire additional land for conservation and recreation.
Objective	Develop a land acquisition strategy that helps prioritize potential parcels.
Objective	Take advantage of all funding resources for land acquisition.
Goal	Protect Boxborough's open spaces.
Objective	Establish a management and maintenance plan for existing conservation lands.
Objective	Encourage developers to create open spaces within new developments that are common contiguous areas and that will add to existing open spaces.
Objective	Preserve large grassland areas, large unfragmented upland areas with varieties of animal and plant species, and upland habitat areas such as the area around Wolf Swamp.
Goal	Enhance public access and connectivity between existing conservation lands.
Objective	Coordinate with adjacent communities to provide regional connectivity and greenways.
Objective	Educate the public about existing conservation lands.
Objective	Provide additional trails and corridors to connect conservation parcels for both human and animal access.
Goal	Improve and increase quality recreational opportunities to meet current and future demands.

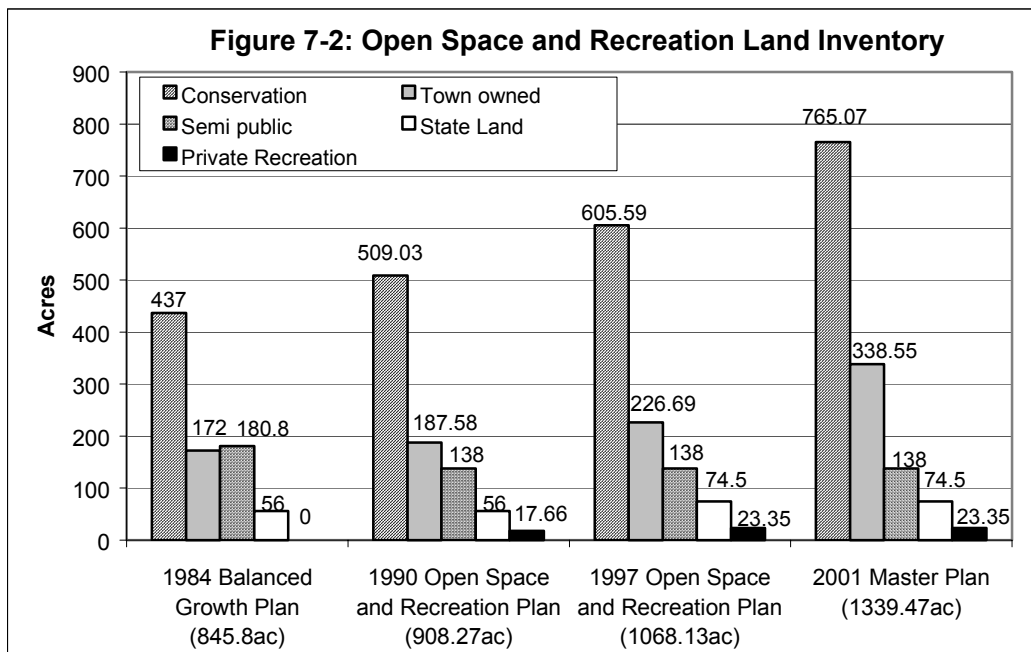
Objective Provide recreational opportunities that balance active and passive, formal and informal activities for all ages.

OPEN SPACE

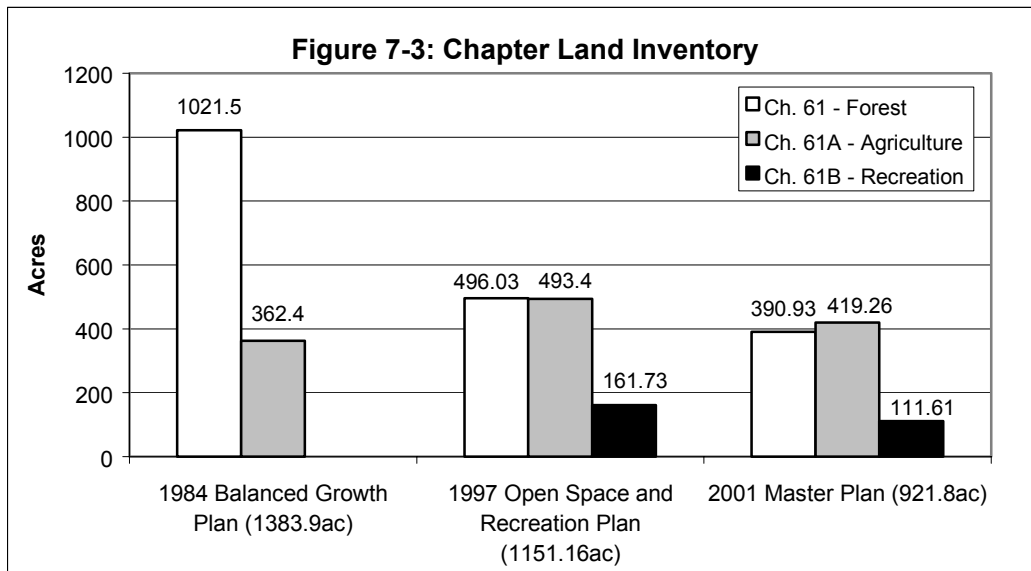
Boxborough residents have historically valued the town's rural character, community spirit, and low density. Residents are concerned about protecting the water supply and other natural resources, as well as the loss of open space to development. Open space is undeveloped land that contributes to these values. For example, open space offers the least threat to water quality

and many plants in vegetated wetlands help filter out sedimentation and pollutants from adjacent developments that may degrade water quality. Undeveloped open spaces also contribute to the “ruralness” of the town and provide areas for community gatherings and recreation. These lands provide habitat to many animal and bird species and provide scenic vistas and visual relief from the developed landscape. Without open spaces, these important functions could be lost. While not all development is undesirable, it is important to strike a balance between development and open space preservation.

Figure 7-2 shows the total acreage of open space reported today and in previous Boxborough planning documents. Boxborough acquired over 350 acres of additional open space during the 1990s. Figure 7-3 shows the total acreage of land designated under Massachusetts General Law (MGL) Chapters 61, 61A, and 61B (Chapter land⁵) reported in Boxborough planning documents. While the total acreage of other open space has risen over time, the number of acres designated as Chapter land has decreased over time. However, the total acreage of open space and chapter lands combined has remained relatively constant over this same period varying only a few acres from 2229.7 acres reported in 1984 to 2219.29 acres reported in 1990 to 2261.27 acres today.

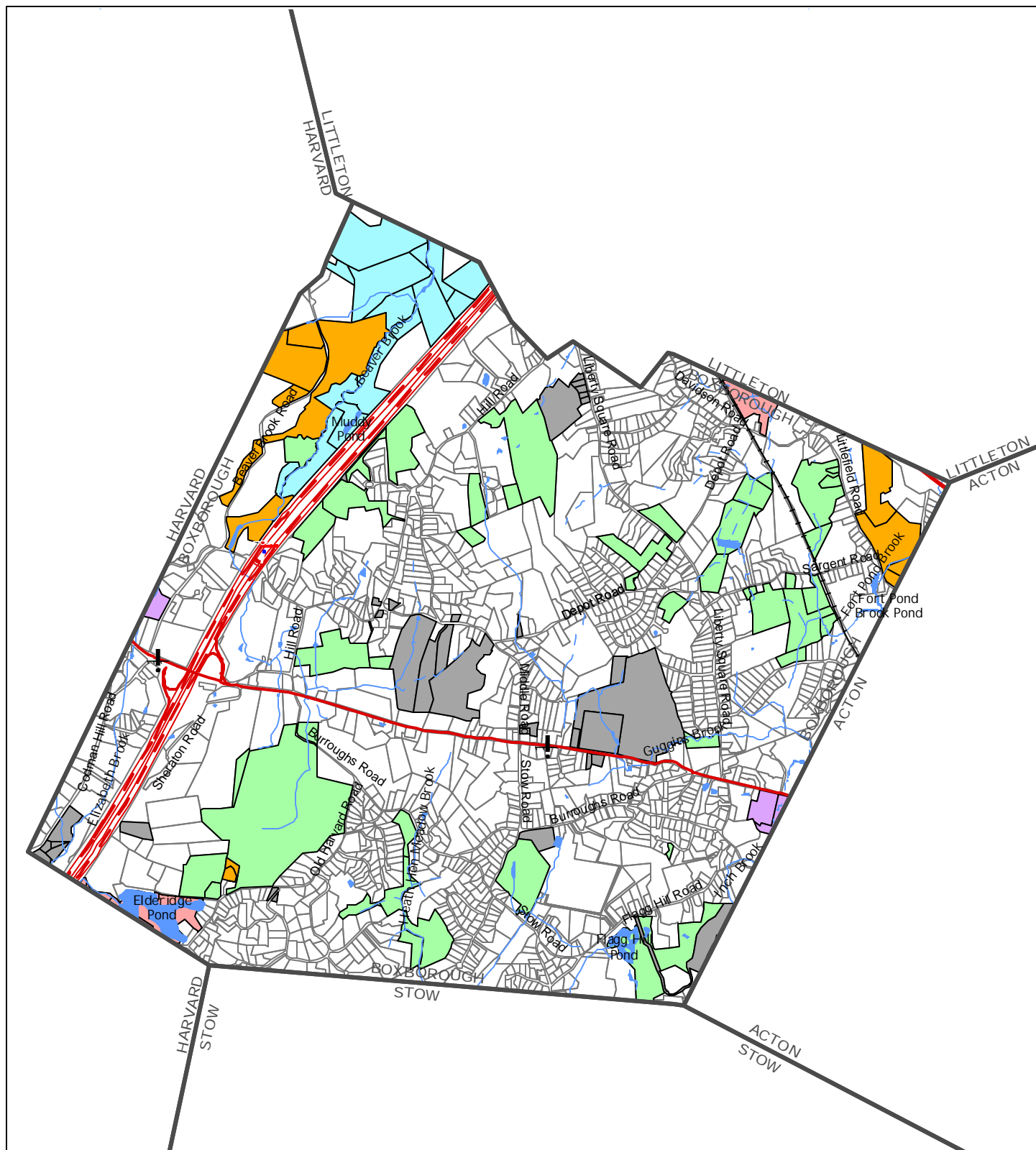


⁵ MGL Chapters 61, 61A and 61B restrict the use of land in exchange for significant reduction in taxes. These are not permanent restrictions and the property owner may sell the land to the town without tax penalty or on the market at a significant tax penalty. Chapter 61 refers to managed forest land, Chapter 61A refers to agricultural land and Chapter 61B refers to private recreation land.



One might conclude that this is attributable to the actions of the Town of Boxborough choosing to exercise its right of first refusal and purchasing all the Chapter lands that were released. This is not the case, however. In 1999, Boxborough acquired the Hetz parcel on Liberty Square Road, thus exercising its right of first refusal for the former Chapter 61 parcel. However, the town has not chosen, nor could it have afforded, to buy all Chapter lands that were released. Some of the open space acquired was the result of a gift and it is merely a coincidence that the acreage of open space added was roughly equal to the acreage of Chapter lands released.

There are a total of 2,261.27 acres of open space in Boxborough with varying levels of protection, accounting for approximately one third of all the land in the town. The total includes 921.8 acres of land designated under M.G.L. Chapter 61, 61A, and 61B. Figures 7-4 and 7-5 show the locations of open space and chapter lands respectively and Appendices 7-1 and 7-2 show the information in tabular form. Without including the Chapter 61 lands, open space consists of nearly 20% (1,339.47 acres) of Boxborough's total land area, approximately one-third of which is wetland. Distribution of the different types of open space is shown in Figure 7-6 and is further described below.



Legend

Open Space by Type

- State Land
- Conservation Restriction
- Municipal Land
- Private Recreation
- Semi-Public Land
- Town Conservation Land

2000 0 2000 4000 Feet



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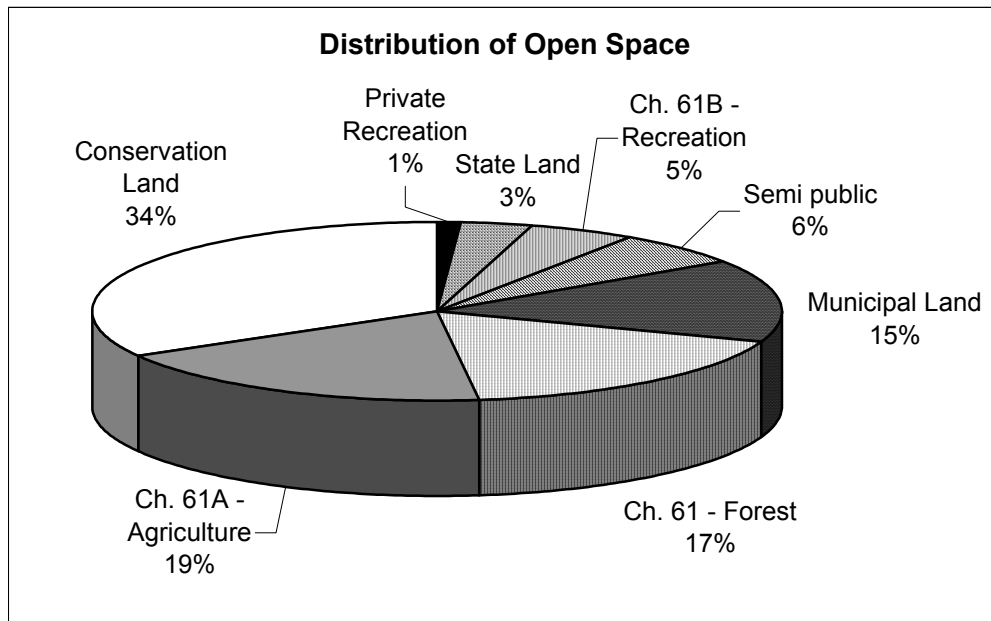
Open Space

Source: MassGIS, Town of Boxborough,
Applied Geographics, Inc.
October 2, 2001
BTI Project No. W-1609.00

FIGURE 7-4
Boxborough, MA



Figure 7-6. Distribution of Open Space.



Protected Open Space

Protected open space refers to lands that are protected for conservation purposes and cannot be developed. Municipal land owned by the Conservation Commission and state-owned conservation lands are considered protected open space, but not all municipally owned land is considered protected as discussed in the next section. Boxborough currently has 36 parcels totaling 765.07 acres of conservation land, including a 20-acre parcel off Sargent Road owned by the Boxborough Conservation Trust. The 229-acre Wolf Swamp is Boxborough's largest conservation parcel. Much of it is wet and inaccessible. Thirty-six acres of the 500-acre Flagg Hill Conservation land are in the southeast corner of Boxborough with the rest located in the neighboring town of Stow. Nineteen Boxborough conservation parcels contain fewer than 16 acres: ten are in the range of 20-38 acres and one parcel is 65 acres. Often these lands have the sense of being larger than they are when one is walking on a trail because they adjoin privately owned land that is currently undeveloped. The protected areas are well distributed around the town, with most areas located within 1/4 mile of residents. In addition to Boxborough conservation areas, the Massachusetts Division of Fisheries and Wildlife owns a single 18.5-acre parcel in the northern side of town along the Littleton town line. The Massachusetts Department of Environmental Management has an easement on a 56-acre parcel on the southwestern end of town for flood control for the Sudbury, Assabet, and Concord Rivers.

Semi-public lands are considered protected open space. These lands are owned by private recreation or conservation organizations that can sell them for development if they choose, but given the nature of the organization are not likely to. There are 138 acres of semi-public land in Boxborough. The Nature Conservancy owns the 82-acre Beaver Valley Preserve in the northwestern corner of town. The land, which is open to the public, includes a large portion of the Boxborough esker. The Harvard Sportsmen Club owns 56 acres of recreational land also in the northwestern corner of town. This land is open to members who pay a fee.

Municipal Land

While some town-owned land is controlled by the Conservation Commission and is therefore protected, other municipal land is owned by the town for municipal purposes and is not considered protected open space. Boxborough has 21 parcels totaling 338.55 acres of municipal land. Municipal land includes the Blanchard Memorial School, Town Hall, the Library, the Police and Fire stations, cemeteries, and the Transfer Station as well as other undeveloped parcels. Though much of the existing municipal land in Boxborough is open, these are sites that the town can develop for future municipal needs such as school expansion or a new recreational facility.

There are two private recreational facilities in Boxborough totaling 23.35 acres. The Nashoba Olympia Skating Rink is located just south of Route 111 near the Acton town line and the Harvard Ridge Swim and Tennis Club is located on the westerly side of Interstate 495 within the Harvard Ridge Condominiums. Both facilities are open to the public for a fee. These parcels have limited protection since they can be converted to a non-recreational use at any time in accordance with local zoning bylaws.

Chapter Lands

Private open lands designated as Forest Lands (Chapter 61), Agricultural Lands (Chapter 61A), or Private Recreation (Chapter 61B) are not protected. The designation of private parcels as Chapter 61, 61A, or 61B restricts the use of land in exchange for a significant reduction in taxes. Under such a designation, the land cannot be converted to residential, commercial, or industrial use. There are 390.93 acres under Chapter 61 for Forest protection, 419.26 acres under Chapter 61A for Agricultural use, and 111.61 acres designated for Private Recreation under Chapter 61B totaling 921.8 acres or roughly 13% of Boxborough's total land area.

Land may be taken out of Chapter 61, 61A, or 61B classification by notifying the town and paying back taxes plus a withdrawal penalty tax. However, such land may not be sold for, or converted to, residential, commercial, or industrial use while taxed under the classification without written notification to the municipality in which it is located. The town then has 120 days to exercise its right-of-first-refusal option to purchase the land. Should this time period pass and/or the town state in writing that it will not act on its option, the land may be developed for alternative uses, removing it from its "open" status as forest, farm, or recreation land.

Chapter 61 Forest Lands require a minimum of ten contiguous acres, which can be classified by a state forester, and require a forest management plan to be developed and implemented by the property owner. Once the application has been received and approved, the classification statement functions as a lien upon the land for taxes levied under the provisions of M.G.L. Chapter 61. The landowner must re-file every ten years or the Assessor shall remove the land from classification. Similarly, Agriculture and Private Recreation land must have a minimum of five acres to qualify, and the status must be renewed every year.

The parcels that are currently under limited tax status as forest, agricultural, or recreation lands are only minimally protected from future development and protection is only ensured if the town is able to act on its right-of-first-refusal to purchase when the property owner makes a decision to

remove the M.G.L. Chapter 61, 61A, or 61B "protections." Therefore, it is critical to assess the property that is currently listed under these Chapters to identify those parcels that are most likely to be subject to development pressure in the near future. The parcels should then be prioritized in terms of their interest to the town for protection.

RECREATION

Recreation Inventory

Boxborough has a number of public recreation areas for both active and passive recreation. All of Boxborough's conservation lands are open to the public for passive recreation including hiking, cross country skiing, snowshoeing, picnicking, berry picking, and nature study. In 1993, the Town of Boxborough published a Conservation Land and Trail Guide, identifying the location of trails on conservation lands within the town. Additional trails and passive recreational opportunities are available on conservation lands acquired by the town since this guide was published.

Table 7-1 lists the recreation facilities and activities in Boxborough. All facilities are public unless otherwise noted. The Recreation Commission maintains facilities at Flerra Meadows, the school department maintains the facilities at Blanchard Memorial School, while other facilities are managed and maintained independently.

Table 7-1: Recreational Facilities in Boxborough.	
Amenity	Facility
Playground	Blanchard Memorial School Flerra Meadows
Gymnasium	Blanchard Memorial School Acton Boxborough Regional High School (out of town limits)
Baseball diamonds	Blanchard Memorial School (1) Flerra Meadows (1) Liberty Fields (1)
Soccer fields	Flerra Meadows (3) 6x6; (2) 4x4 Use fields in Acton Liberty Fields (1) 11x11; (2) 6x6 Field at the northwest corner of the Cisco Development off Beaver Brook Road*
Tennis courts	Harvard Ridge Swim and Tennis Club (2; public use for a fee)
Skating rink	Flerra Meadows (pond) Nashoba Olympia (public use for a fee) Town Square Pond
Fishing pond or stream	Blanchard Memorial School Rolling Meadows Flerra Meadows Guggins Brook Land Harvard Sportsmen Club (public use for a fee)

Pool	Harvard Ridge Swim and Tennis Club (public use for a fee) Acton Boxborough Regional High School (out of town limits)
Archery Range	Harvard Sportsmen Club (public use for a fee)
Rifle Range	Harvard Sportsmen Club (public use for a fee)

*Facilities under construction

The Boxborough Recreation Commission also sponsors many recreational programs throughout the year for all ages. These programs are as follows:

- Winter Recreation Program – Open to children kindergarten through 6th grade, this program is held on Saturday mornings from January to March offering basketball, soccer and a combination “all-sports” program.
- Gymnastics – This program is held on weekdays after school for ten weeks from January to March. It offers elementary gymnastics instruction to children kindergarten through 2nd grade.
- K-6 Summer Playground – This program is open to elementary age children and offers organized and well-supervised games, sports, and creative activities during the mornings for the month of July at Flerra Meadows Field.
- Fifer’s Day – The Recreation Commission sponsors children’s activities, such as the three-legged race and the potato sack race, at the annual Fifer’s Day celebration.
- Men’s Basketball – The Recreation Commission sponsors a men’s basketball league during a weekday night from September to May.
- Coed Volleyball – The Recreation Commission sponsors an adult volleyball league during a weekday night from September to May.
- Winterfest – Started in 1997, Winterfest celebrates the winter season at Steele Farm. Activities include a bonfire, music, sledding, ice-skating, animal presentations, and a bake sale.
- Senior Aerobics – Classes held at Town Hall.
- Basketball Skills Drills – Open to children in grades 3 through 6, this program, held on Monday nights for six weeks in September through October, prepares children for basketball games/leagues that begin in December/January.
- Basketball Skills Drills Jump Start – Open to 1st and 2nd grade children, this program, held on Saturdays for 7 weeks from January to March, offers beginning basic skills.
- CPR and First Aid Classes – This joint venture with the Firemen Association offering spring and fall classes through the Recreation Commission is open to all Boxborough residents.
- Soccer Skills Drills – Open to children in grades 1 through 3., this program, held on Sundays for six weeks in March/April, offers basic soccer skills to prepare children for the soccer leagues in April.

Recreation Needs

According to the 2000 Boxborough Town Survey, 73% of those surveyed use the town recreational facilities or programs at least occasionally, but only 44% found them adequate to serve their needs. The national park standards for town recreation facilities were identified in the OSRP and listed below in Table 7-2.

Table 7-2: Comparison of Boxborough to National Park Standards for Town Recreation Facilities.

Activity	Standard per person	<i>Existing</i>	<i>Required at build-out</i>
Hiking trails	1 mile per 4,000		<i>1.75 mi.</i>
Nature trails	1 mile per 2,500		<i>2.8 mi.</i>
Equestrian trails	1 mile per 6,250		<i>1.12 mi.</i>
Bicycle trails	1 mile per 2,000		<i>3.5 mi.</i>
Jogging trails	1 mile per 2,000		<i>3.5mi.</i>
Playgrounds and parks	1 area per 1,000	<i>2</i>	<i>7 areas</i>
Picnic tables	1 table per 300		<i>23 tables</i>
Tennis courts	1 court per 1,500	<i>2</i>	<i>4-5 courts</i>
Basketball courts	1 court per 1,000		<i>7 courts</i>
Volleyball courts	1 court per 3,000		<i>2 courts</i>
Shuffleboard courts	1 court per 2,000		<i>3 courts</i>
Horseshoe pits	1 pit per 2,000		<i>2-3 courts</i>
Baseball diamond	1 per 3,000	<i>3</i>	<i>2</i>
Softball diamond	1 per 3,000		<i>2</i>
Soccer fields	1 per 4,000	<i>3</i>	<i>2</i>
Golf course	18 holes per 125,000	<i>0</i>	<i>NA</i>
Swimming area	1 sf per person	<i>1</i>	<i>1</i>

Source: National Park Service as printed in the 1997 Town of Boxborough Open Space and Recreation Plan

According to these standards, based on existing facilities and a population of nearly 5,000 residents, Boxborough needs bicycle trails, 2-3 additional playgrounds, picnic facilities, 2 tennis courts, 3 basketball courts, 2 shuffleboard courts, 2 horseshoe pits, and a swimming area. Recreational needs identified in the 2000 Town Survey differed slightly from these standards and included bike paths, field space, softball diamond, swimming pool/pond, cross-country ski trails, and bike paths. These needs were consistent with those identified by the community during the OSRP process.

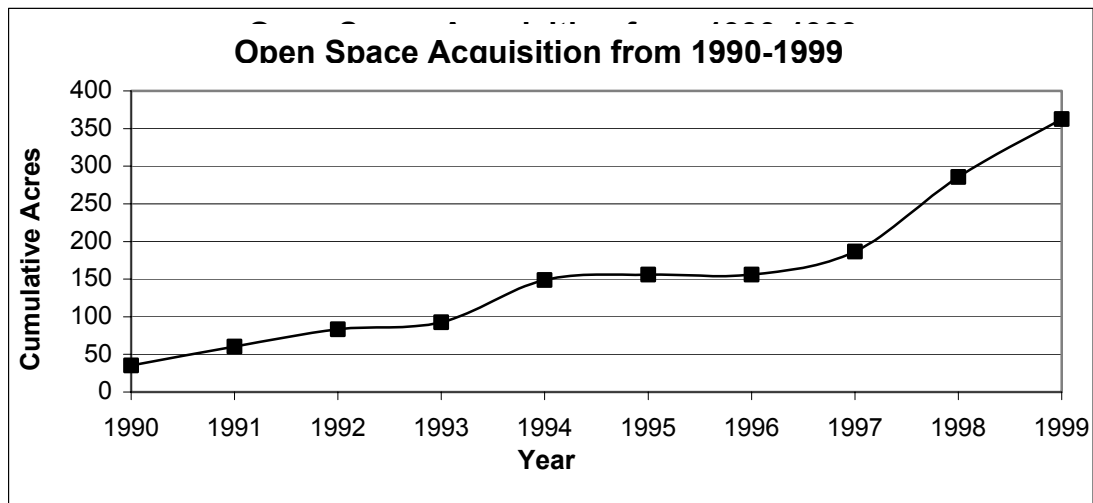
Some additional athletic facilities are planned in Boxborough. A multi-purpose athletic field (250' by 400') with accessory parking has been built off Beaver Brook Road in the northwest corner of Cisco Development Partners, LLC – NEDC Site 2. The field has been seeded, but will not be usable at least until the fall of 2002. As part of the Tax Increment Financing Agreement, dated June 26, 2000, between Cisco Development Partners, LLC and the Town of Boxborough, it is anticipated that ownership of the ten-acre parcel including the field and parking will be transferred to the town. The Town of Boxborough is also constructing three additional soccer fields and a baseball diamond on the Hetz land. At the Annual Town Meeting in May 2001, a vote of 86 to 14 approved the anticipated \$588,000 cost of building the badly needed fields. It is expected that the fields will be ready for use in Spring 2003.

OPPORTUNITY AREAS AND ACQUISITION STRATEGY

Open space is the key to many of Boxborough's goals. Open space defines community character. Retaining open space by keeping development away from water supply resources and avoiding the possibility of contamination is a public health concern. Maintaining wetlands is important to water quality and flood control. Thus, when parcels of undeveloped land become available for town acquisition, it is important for the town to be able to evaluate the acquisition potential in light of community goals and public interest values.

The community has always valued its open space and has identified protection and acquisition of open space as a high priority. According to the 2000 Boxborough Town Survey, 82% of the townspeople use the conservation lands at least occasionally (and 59% thought these lands were adequate). During the 1990s, Boxborough acquired over 350 acres of open space through a combination of purchases and gifts, as shown in Figure 7-7.

Figure 7-7. Open Space acquired from 1990-1999.



The 1997 Open Space and Recreation Plan identified eight areas of town for land acquisition for open space and municipal land. (The Conservation Commission is in the process of updating the Open Space and Recreation Plan.) Since the completion of the plan, a number of parcels have been acquired in six of these areas including Flagg Hill, Flerra Estates, Picnic Street Trust, and Sudbury Valley to name a few. To continue the trend of increasing open space in Boxborough, a resource sensitivity analysis was completed to evaluate the existing conditions and determine areas suitable for acquisition.

Many factors are involved in determining what parcels to acquire for open space and recreation. At the community workshop on February 27, 2001, the participants were asked to assign values to a number of resource indicators. These include the protection of town character (scenic areas, historical areas, agricultural resources, and recreational areas) and the protection of natural resources (water supply and water quality, forest lands, wetlands, biological diversity, and flood storage). Their assessments resulted in a Resource Sensitivity Map (Figure 6-10 in Chapter 6).

There are also many factors beyond the resource sensitivity analysis that can be considered in the land acquisition decision-making process. These include contiguity with existing open space areas, development potential, size of parcel, recreational opportunities, accessibility, and cost to develop and maintain. The total value obtained from the resource sensitivity analysis can be modified based on these additional factors. Each factor would be given a public interest value or exchange value of "high," "medium," or "low." The "low" value would equal 1, while the "high" value would equal 3. The factors, listed in Table 7-3, would act like switches, which can be turned on or off depending on the use of the parcel in question and the perspective of the decision-making board.

Table 7-3: Public Interest Factors for Land Acquisition Strategy			
Exchange Factor	High value	Medium value	Low value
Size	Equal to or greater than 20 acres	10-20 acres	Less than 10 acres
Contiguity to another protected parcel	Abuts more than one protected parcel	Abuts one protected parcel	Isolated parcel
Road frontage for public access		Has frontage	No frontage
Environmental impact	Equal to or greater than 75% wetlands	Less than 25% wetlands	No wetlands
Flood control	Within 100 year flood zone	Within 500 year flood zone	Not within flood zone
Scenic views	Site provides distinctive landscape value or character viewable from a public way or provides a viewpoint to significant wide-angle unobstructed views	Site provides interesting landscape features that are not readily accessible. One must hike in to see views.	No scenic qualities
Historical resources	Features contain significant historical, cultural, or archaeological value	Since a historical survey has not been done, it is difficult to rank parcels. - NA	No features
Biodiversity	Listed in the Mass. Natural Heritage Atlas as having state-wide significance or provides a corridor linking other open land.	Site has local significance as a habitat	Little or no significance
Proximity to Town Center and Route 111	Within 0.5 miles of Town Center District	Site is between 0.5 and 1 mile	Site is more than 1 mile

Chapter 61, 61A, and 61B lands were mapped and ranked according to the community sensitivity ranking. Different acquisition strategy scenarios were then developed. Figure 7-8 illustrates

how these parcels were numbered based on the town-wide sensitivity ranking. Multiplying the sensitivity value by the relevant public interest factors produced a new ranking value. This allows the user to alter the ranking for a given purpose. Refer to Appendix 7-3 for the tables showing the ranked values.

The sensitivity analysis, presented in Chapter 6 and analyzed in this section, is not intended as a regulatory map, but as a guideline for land acquisition and responsible development. It is a composite analysis of the town's existing conditions as weighted by the community. The parcels with the highest ranking based on the straight sensitivity analysis value would best serve as conservation lands, since the resources identified contribute to conservation. Likewise, those areas with low sensitivity values are best targeted for development. As illustrated above, the sensitivity analysis, coupled with the additional switch factors, is one way to evaluate different parcels for different acquisition needs.

While a high sensitivity value does not preclude development, it does necessitate a level of sensitivity to the on-site resources. The town could impose design guidelines to ensure that development within sensitive areas is not detrimental. The Open Space Commercial Development bylaw is one way Boxborough has addressed this. It allows the development to be concentrated on a portion of the site that is less sensitive, while protecting more sensitive areas.

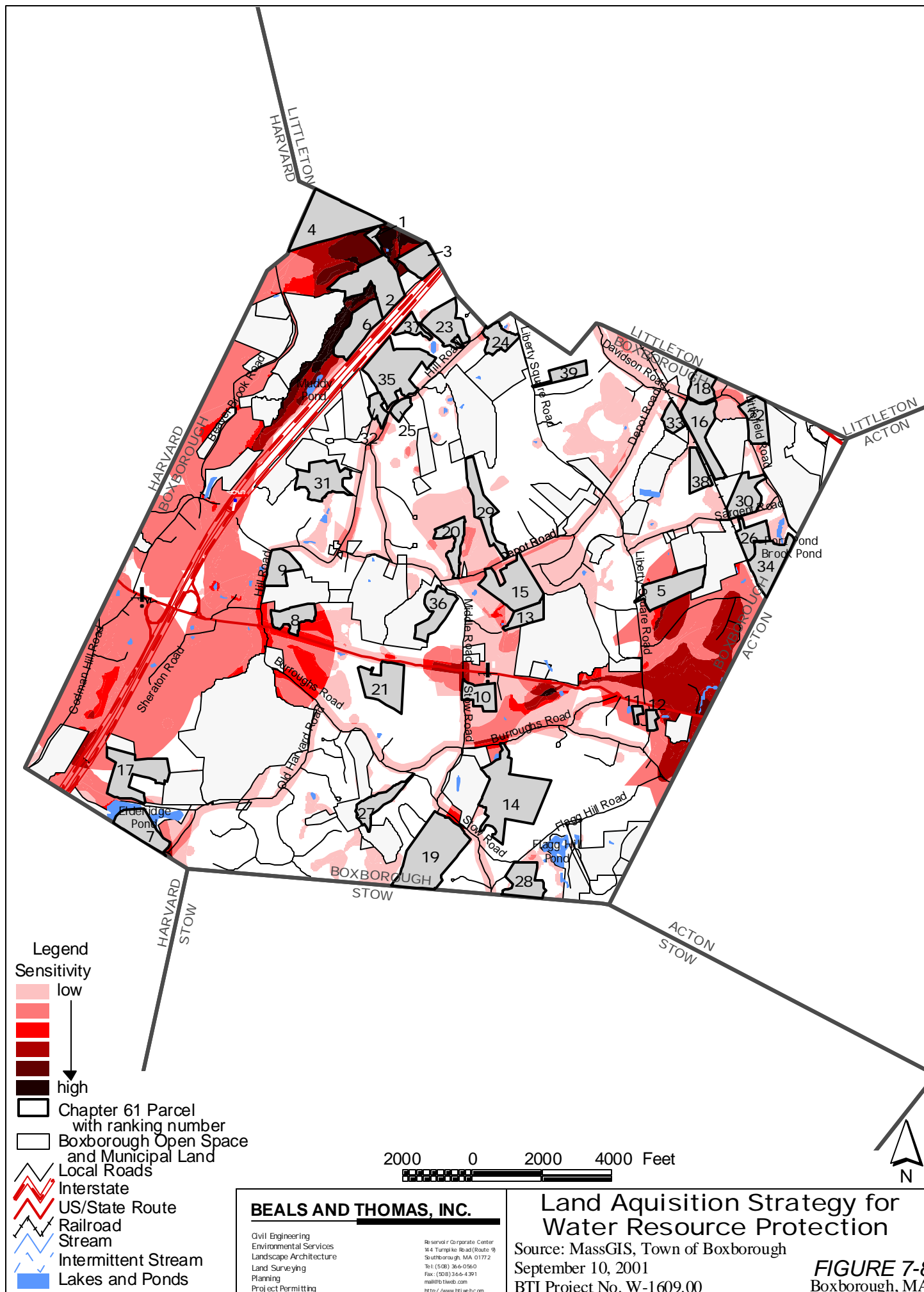
Conservation Commission and Open Space Acquisition Strategy

Boxborough's Conservation Commission takes seriously its charter to preserve open space by bringing to Town Meeting conservation-important land acquisition proposals. Since 1997, the Commission has developed its own land ranking model to rate parcels for future acquisition as conservation land. Where it differs from the master plan Resource Sensitivity Analysis is the inclusion of several factors: passive recreation, a parcel size threshold of 5 acres rather than 20, and the inclusion of parcels that are open space, but not Chapter lands. The Conservation model also does not include such factors as proximity to Town Center and Route 111. Other factors are similar, but may have slightly different titles.

Using a weighted system, the Conservation Commission model considers the following factors:

1. Linkage to other protected properties,
2. Accessibility to the public,
3. Presence of a variety of wildlife habitats,
4. Scenic value,
5. Groundwater resources,
6. Passive recreation,
7. Agricultural value,
8. Size of parcel,
9. Any other special features.

Many of these factors are included in the resource sensitivity analysis used in the master plan, but the Conservation Land Rank Model is more specific to conservation land requirements. The Commission will continue to evaluate all Chapter 61 lands, as well as any undeveloped land larger than five acres. At the special Town Meeting of November 5, 2001, the Commission



presented its open space goals for the next five years. These goals will be incorporated in the new Open Space and Recreation Plan, which is presently being written.

Open Space Goals:

1. Protect through acquisition and conservation restriction larger, less fragmented areas.
This may be accomplished by the protection of lands abutting existing conservation land. The Commission has identified the area bounded by Hill Road, Liberty Square Road, Depot Road, and Middle Road as having the potential to become 200 to 300 acres of protected land. This may be Boxborough's last opportunity to develop a conservation parcel of this size. This area consists of hickory-oak and beech upland forests with clusters of vernal pools that are rich with blue-spotted salamanders and spotted turtles, both state-listed rare species. Placing this interior land in conservation would connect six existing conservation parcels, providing an extensive trail system for passive recreation. The area is also an important water resource since it is recharge area for the Guggins Brook Drainage Basin.
2. Provide additional trails and corridors connecting the conservation parcels.
Increasing the trails and the land connections between existing parcels would benefit the public and the wildlife. The Commission will work with landowners and developers to develop a greater connectivity throughout Boxborough.
3. Preserve upland habitat around Wolf Swamp and connectivity to the Delaney Project.
Wolf Swamp (229 acres) and the state-protected Delaney Project (500 acres) are two extensive wetlands that are connected by an unprotected and currently undeveloped upland area. It is important for the wildlife that breed in and use these wetlands to have access to uplands for food and shelter and a safe corridor to move between the two wetland systems. The Commission will work with the commercial developer who owns this upland to protect a portion of it.
4. Preserve a large grassland area.
Grasslands are becoming a rare habitat in our area and they are an essential habitat for many birds. The Commission will seek permanent protection for the open fields of Steele Farm and Picnic Street Trust, where it is known that bobolink breed and raise young. The Commission will continue to maintain the pasture as grasslands as it does at Livermore (Beaver Brook Meadows), Rolling Meadows, and High Pastures. Steele Farm would be an important addition to these other meadows because of its larger acreage in pasture. Many birds like the bobolink, eastern meadowlark and savannah sparrow will only nest in grasslands over 10 acres. Steele Farm is used by migrating warblers, sparrows and larks and provides a source of prey for owls, hawks, and red fox.
5. Develop and implement management plans and stewardship groups for the land under conservation protection.
This is an ongoing project with the Commission and its associate members. Management plans for six conservation parcels are almost completed. They establish baseline data regarding natural communities, wildlife, trail locations, and public usage. Short term and long-range maintenance plans will give direction to the Public Works Department and stewards.

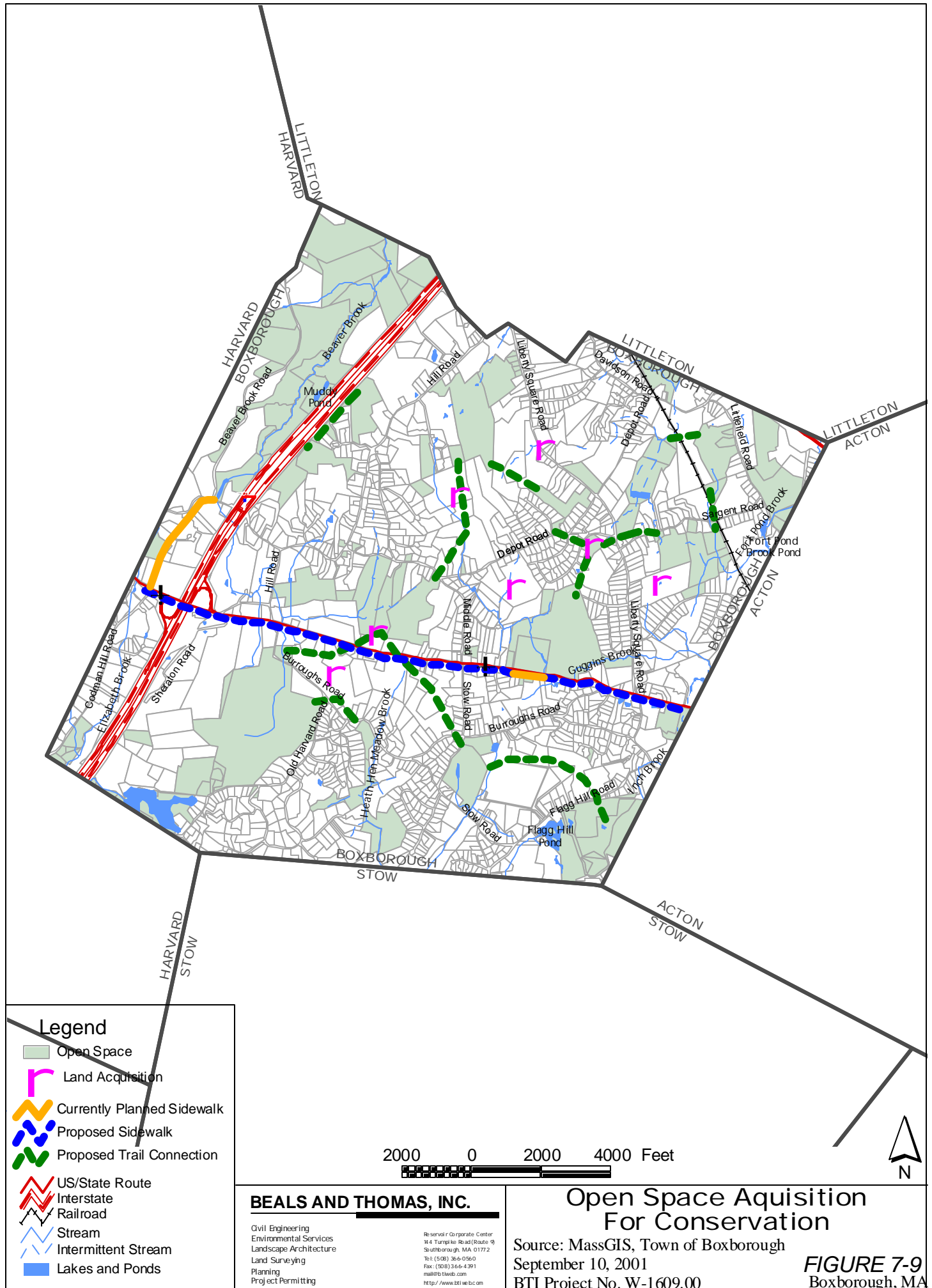
A stewardship program for the conservation lands will provide for greater citizen involvement, more rapid response to problems, and better maintenance.

It is the hope of the Commission that the town's people will find being a steward a rewarding experience. A new trail guide will be developed through the use of GPS, GIS, and the work of volunteers.

CONCLUSION AND RECOMMENDATIONS

The residents of Boxborough value open space and the town acquired over 350 acres of open space during the 1990s. The protection of open land is one of the key actions that the town can take to achieving the goal of retaining town character. The major issues relating to open space and recreation are open space preservation and acquisition and increasing open space accessibility and recreational facilities to meet the needs of the growing population. Actions that the town should concentrate on for acquisition and preservation include prioritizing chapter lands for acquisition, collecting funds for acquisition, and educating the public about the tax benefits of Chapter 61, 61A, 61B, Agricultural Preservation and Conservation Restrictions. The Open Space Acquisition Strategy or the Conservation Commission's Land Ranking Model should be used in this effort. Other boards and commissions may want to use their own ranking system based on the Resource Sensitivity Analysis base map. Other items relating to preservation and maintenance of open space include sponsoring clean-up days or conservation land adoption programs that connect the community to the conservation lands, thereby increasing awareness and responsibility towards the open space.

Actions relative to accessibility and recreational facilities include evaluating recreational needs based on population and demographics and developing additional facilities to meet existing and future needs. Another important action item is to update the Conservation Land and Trail Guide and to develop connections between existing conservation lands. Figure 7-9, the Open Space Acquisition for Conservation, identifies some potential trail and open space connections. These objectives and action items are further detailed in the Action Plan (Chapter 11).



CHAPTER 8 PUBLIC SERVICES

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PUBLIC SERVICES

GOALS AND OBJECTIVES

Goal	Provide an acceptable level of service for educational and public facilities while keeping pace with increased populations but within the fiscal constraints of the town.
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Objective Continue to maintain a high level of town services.

Objective Provide adequate space for operation of town services.

Objective Meet the service and infrastructure needs of a growing population.

Goal	Ensure that Boxborough's water supply and water quality are protected.
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Objective Provide an adequate water supply that is of high quality.

Objective Restore polluted natural resources.

Goal	Adopt environmentally sound town policies.
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INTRODUCTION – TRENDS IN TOWN GOVERNMENT

Residents who have participated in this Master Planning process have indicated that it is the people, the services and the character of Boxborough that makes the town so special. This chapter focuses on the more tangible public facilities, infrastructure, and some of the social programs that support Boxborough.

A priority goal of the Boxborough Conservation Commission and the Boxborough Board of Health is to protect the water supply for local drinking water, as well as to protect these resources for recreation, aesthetics, and habitat. Boxborough residents also identified water quality as important throughout the Master plan survey and public workshops. Related to water is its byproduct, wastewater, and the need for sufficient disposal systems that protect

against water pollution problems. Taking water from its natural state in surface water bodies or groundwater to the consumer and subsequently away from the consumer for treatment requires a complex system of pipes, pumps and treatment facilities; or alternatively, individual wells and septic systems or "alternative" septic disposal systems, also known as "package treatment" systems. This chapter discusses these systems, future needs, and plans for the future.

Finally, of utmost importance, are Boxborough's Public Safety, Public Works, Education, and Social Services. This chapter discusses the role, level of service and programs of existing and anticipated needs of the Boxborough Police and Fire Departments, public schools, the Department of Public Works (DPW), public library, and elder and youth services that contribute to the safety and community fabric of Boxborough.

EXISTING CONDITIONS

Water Supply

All of Boxborough's water comes from approximately 43 inches of annual rainfall. About 17% of the total land in Boxborough is wetland. Boxborough has six streams within its borders. Although Boxborough does not have any lakes or ponds serving as public water supply, there are a few that provide public safety resources and wildlife habitat. Boxborough has four significant sand and gravel aquifers. The EOEa estimates current water use at 122,542 gallons per day, based on 75 gpd per person and 75 gpd or 1000 square feet of gross floor area of commercial/industrial space. A 1994 report on Boxborough's water resources indicates that Boxborough does have a groundwater supply that is sufficient to support the community at build-out using the current zoning. The report, however, indicated that water quality might be a future issue. A new bedrock well was created for Blanchard Memorial School, Police Department, Fire Department and possible new Library. The purpose of this well is to replace an existing well for the School with elevated nitrate concentrations and potentially to provide municipal water. Protection of these areas is important to preserving water quality in Boxborough. The water supply is currently being studied. This Water Resources Study will be available in early 2002.

Wastewater Treatment

Boxborough presently does not have a public sewer system. Most residents and businesses are served by private septic systems. There are some wastewater treatment facilities, one at the Holiday Inn and one under construction at Brook Village condominiums. A new septic system is also being installed on the Hager land. The system is designed for the Blanchard Memorial School, Fire Police and Highway tie-ins with potential for serving future needs. Boxborough Meadows condominiums and Cisco Systems will have wastewater treatment facilities.

Individual septic systems provide adequate water quantity, but can be problematic in terms of water quality. For instance, Boxborough presently has no system of regular inspection of septic systems; maintenance is the responsibility of the property owner.

Public Safety

Police Department

Boxborough's Police Department consists of ten full-time police officers, including two Sergeants and Chief and 8 part-time officers. In 1999, two new officers were hired under a grant from the Department of Justice COPS FAST program. In FY 03 these two officers will be paid out of the town operating budget. Boxborough's Police Department today represents a small town department, located next door to the Fire Department, on Route 111. The Department owns five vehicles, three marked and two others. Motor vehicle issues consistently comprise a majority of the total incidents. These issues are normally followed by responding to requests for officers and burglar alarms.

Table 8-1: Ten Most Frequent Incidents Requiring Police Assistance in 2000

Arrests	133
Complaints/Summons	121
Motor Vehicle Issues*	87
Vandalism	39
Larcenies	37
Disturbances	26
Protective Custody	16
Breaking and Entering	14
Child Welfare	12
Alcohol Offenses	10
Annoying Phone Calls	10
Other Police Related Calls	24
Total	529

* Includes summons, accidents with and without injury, complaints and lockouts.

Source: Boxborough Police Department

The Police Department applied for and recently received grant funds from the Executive Office of Public Safety for the implementation of the DARE Program and Community Policing grant funds.

The Police Department is located in a 5,000 square feet Building on Route 111 next to the Fire Station. The building was completed in 1990 as part of a \$1.5 million Proposition 2 ½ override that also included Town Hall expansion and Fire Station Renovation. The Chief of Police indicated that the facilities are appropriate for the Department's needs. In 2000, a public safety dispatch center, which serves Fire, Ambulance and Police, was placed in the Police facilities.

Fire Department

The 4,625 square foot fire station in Boxborough is located on Route 111. Fire protection for the Town of Boxborough is developed around a rural community. Boxborough has no municipal water supply and firefighters must bring water to

where there is a fire by laying a line from a water source and/or by tanking operations. The water supply comes from a pond located next to the firehouse and from 17 fire ponds and 22 underground cisterns distributed around town to handle fire safety needs. In general, according to the Fire Chief, William E. Clayton, water pressures are adequate in the town water system for fire protection.

The Fire Department consists of approximately four full-time fire fighters, including the Fire Chief, and 28 per diem and on-call firefighters. All of these are paid positions. According to Fire Chief, around the clock coverage is provided by a combination of full-time, part-time, and per diem firefighters. In the near future the department will require the ability to man the fire station around the clock with full-time personnel. This would require the need for at least 5-9 additional firefighter/EMTs. Chief Clayton noted that the Boxborough Fire Department has directed its energies toward fire prevention, including plan reviews, code maintenance and public education.

The Fire Department must keep its apparatus and equipment up to date to meet the needs of the growing population and the increase in commercial developments. Depending on the final build-out of commercial and industrial uses in the west end of the town and the need for rapid response in that area, a satellite station may be required. The major duties of the Fire Department include responding to fires and other emergency situations, fire prevention inspections, public safety education, safety code regulation enforcement, issuing permits, and plan review and safety inspection for new buildings.

From 1995 to 1999, the number of calls for assistance increased by 30%. Alarm responses and motor vehicle responses represent a majority of the calls. In 1998, I-495 accounted for more than 60% of the motor vehicle accidents.

Department of Public Works

The Department of Public Works (DPW) primary responsibilities are maintaining the local roadways, parks, and transfer station operation for the town.

Municipal Solid Waste

Boxborough has a transfer station operated by the town. The permitted capacity is 25 tons per week and the operating capacity is normally below that amount. At the end of the fiscal year, if excess permitted capacity remains, Boxborough engages in trash swapping with other Northeast Solid Waste Committee (NESWC) communities. In FY 00 Boxborough used 1138 tons of the permitted 1299 tons, or roughly 22 tons per week of the permitted 25 tons per week. According to the Northeast Solid Waste Committee (NESWC) Strategic Planning Community Survey, approximately 1003 households are served by the municipal solid waste and recycling programs. Private subscription haulers serve about 768 households. Boxborough estimates that 98.5% of the municipal solid waste in the town comes from single-family residences and the remainder from multi-family residences located on Codman Hill Road.

Boxborough does not provide trash collection services for its residents. Although Boxborough is increasing in population, the amount of tonnage has not increased proportionately because new families often have private pick-up. Apartments and condos also have private pick-up. Boxborough pays a per-ton tip fee of \$120 per ton of Municipal solid waste as well as a lump sum for collection/hauling of \$175 per haul. Recycling services are provided to Boxborough residents. Recycling is collected at the transfer station. Boxborough pays a lump sum of \$150 per load for recycling.

Town Hall

The Town Hall on Middle Road houses the general government operations in 8,300 square feet of space. The building has almost 2,100 square feet of meeting room space, 1,800 square feet for 13 full-time and 2 part-time staff, and 335 square feet of storage/archive space. The remainder is circulation, bathroom and common space. Town Hall contains the offices of the Board of Selectmen, Town Administrator and Assistant Town Administrator, Building Department, Planning Department, Conservation Commission, Board of Appeals, Board of Health, the Assessor, Treasurer, Accountant, Tax Collector, Town Clerk, and Council on Aging. Other boards and committees including the Grange, Garden Club, and other civic groups also use Town Hall.

In 1990, Town Hall was expanded to include more office and meeting room space and a storage vault. At the same time, a handicapped accessible lift was installed. Even with the 3,600 sq. ft. 1990 addition, Town Hall is too small for current needs.

Education

The high quality of education is one of the many qualities that attracts residents to Boxborough and keeps them invested in the community. In 2000, 98.6% of the children in Boxborough attended public schools, a rate higher than the state average. Boxborough is home to Blanchard Memorial School, which houses grades K-6. Blanchard Memorial School contains a library that coordinates with the Boxborough Town Library to provide services to the students. In fiscal year 2000, education comprised 55% of the total general fund expenditures, according to the Massachusetts Department of Revenue, Division of Local Services. Local officials have indicated that the percent may be closer to 64%.

Boxborough sends its junior high students to R. J. Grey Junior High School and high school students to the Acton/Boxborough Regional High School and to the Minute Man Regional High School. These high schools were Inter-District School Choice Schools. The School Choice Program is being phased out; the school no longer accepts school choice students.

Although the overall number of school-aged children was relatively steady for many years, it began to rise and fluctuate in 1992. The number of kindergarten children began to rise at that time, reflecting the influx of younger families with young children. In 1999 there were 644 students, in grades K-6 and in 2000 that number fell to 631. There were 46 teachers and 36 support staff at the Blanchard Memorial School, making the ratio close to 1:14. The average classroom size was about 20. Kindergarten classroom sizes ranged between 14 and 17 students.

Table 8-2: Blanchard Memorial School; Breakdown of students – as of May 1, 2001

Grade	K	1	1-2	2	3	4	5	6	Total
# of Students	79	63	40	84	93	85	95	92	631

Source: Boxborough School Department

Table 8-3: Blanchard Memorial School Enrollment by Race/Ethnicity - 1999

Race	% of District	% of State
Native American	0	.25
African American	.47	8.62
Asian	11.34	4.28
Hispanic	1.4	10.2
White	86.8	76.65

Source: Boxborough School Department

Table 8-4: Boxborough Schools in 2000

School	Grades	Boxborough Enrollment (2000)
Blanchard Memorial School	K - 6	631
R. J. Grey Junior High School	7 - 8	174
Acton-Boxborough Regional High School	9 - 12	268
Minuteman Regional High School	9-12	17
Total		1090

Source: Mass. Department of Education Website

The 1998 Town Meeting approved the expansion/renovation of the R.J. Grey School building, an Acton-Boxborough Regional School. In 1998, there were 809 seventh and eighth grade students at the new R.J. Grey Junior High School, 156 of which were Boxborough students. In 2000 a similar project was approved for the Acton-Boxborough Regional High School. These projects are under construction.

At the May 1999 Town Meeting, residents voted to proceed with plans for the design of a second elementary school in Boxborough. Designs have depicted two buildings, using Blanchard Memorial for grades 3-6 and a new building on the Hager property for grades pre-K to grade 2. Currently, the project is on hold due to review school population changes.

Library

In FY 2000, the library circulated 38,242 volumes and maintained a holding of 28,565 volumes. Circulation has risen steadily with the increase in population. In order to better serve the public, the library has become a full member of the regional library system to provide more complete information and access for patrons for the region's service. Boxborough will also use a circulation and collection management system provided by the region, eliminating the necessity of maintaining a stand-alone and redundant system. Joining the regional library system will require added training of staff additional computers, and higher membership fees. Additional patronage and more demands for materials of a greater variety have put stress on the staff and budget. With each increase in operating costs, the Board of Library commissioners requires an increase in the book budget in order to receive State aid.

Even at Boxborough's current population, the 3,800 square foot library, built in 1966, is inadequate to meet town needs: Books and other materials collections, especially for non-fiction and young adults are sub-par; there is no space to site and read or to do research; there is no meeting space to hold library and cultural activities; children's programs are over-subscribed; and the facility is not fully handicapped accessible. As a result, in 2001 the town approved the construction of a new 12,245 square foot library, contingent on being approved for a state construction reimbursement grant. The grant will pay for approximately 40% of the cost. The new library will be located on the Hager land at the front of the parcel; its location was jointly planned with the School Committee so that the parcel could also be used for a new school. As required by the State, the new library will support the 20-year population projection for the town. Occupancy is planned for 2004.

Social Services

Senior Services and Needs

A representative from the Council on Aging noted that seniors might be affected by the lack of affordable housing, and increases in taxes. Although MAPC and MISER population projections indicate an increase in the over 70 population, seniors may find it increasingly difficult to afford to live in Boxborough.

Some of the needed facilities for seniors in Boxborough include: affordable housing for seniors, a senior center, and senior transportation. The COA estimates that there are 385 seniors living in Boxborough. If, according to the population projects, this number increases, there may be a need for additional senior services.

Cemetery Needs

There are two cemeteries on town-owned land. Currently, there are 14 burials per year. In approximately 30-40 years all of the plots will be sold. Any land to be considered for expansion should be a low, sloping, gravel area.

COST OF COMMUNITY SERVICES

The costs of community services are projected from the results of the build-out analysis by applying locally specific costs to the projected build-out while maintaining a desirable level of service. (See Chapter III for a discussion of Build-out.) The cost of community services assessment was performed by identifying acceptable per capita service levels for various community services. This was accomplished by comparing Boxborough to national standards as identified by the Urban Land Institute. EOEA used information from various state agencies and other sources to determine the potential build-out population and infrastructure impacts. Unless other more current information was available, EOEA's Community Data Profile information was utilized to determine the cost of services. The Town and MAPC build-out projections were the low and high end of the range of build-out projections respectively, thus they will be used to present a range of potential infrastructure improvements and cost of services.

A cost averaging method was used to identify and project community service costs. Under this method, an average cost for various municipal services is determined and that cost for each service is multiplied by the number of new residents or housing units to be services; cost of municipal services for commercial and industrial buildings is determined on a per square foot basis. There are other methods of determining cost of services, such as marginal cost analysis, or comparable cities analysis, but they may not provide an accurate picture of a community or may be time-intensive to produce. The data needed for a cost averaging cost of services is readily available and can be confirmed by town staff. The Massachusetts Department of Housing and Community Development (DHCD) has produced a "Growth Impact Handbook" which relies heavily on the cost averaging method. Since one of the goals for the master plan is to qualify with DHCD under the Executive Order 418 Program, it was assumed that DHCD would be more familiar with that methodology.

The baseline cost of services analysis is based on operating costs, including debt service. The study focuses on tax revenues and town expenditures and does not take into account the intangible benefits to the town of job creation and industrial philanthropy. To determine appropriate baseline information, Beals and Thomas, Inc. contacted local service departments in Boxborough to calculate the current level of service and existing or foreseeable needs. Representatives from the Police and Fire Departments, school system, library, and Department of Public Works were involved in providing this information; for example, number of police officers, student: teacher ratio, demand for water and disposal services and so on. From this baseline, the costs of providing these services on a per unit basis were projected.

This model provides flexibility and allows for future updates. Where a current need has already arisen, or is imminent, we have adjusted our calculation of community costs accordingly. This data forms the basis for the creation of local standards that should be updated on a regular basis to determine future needs. Boxborough can use this information for planning to accommodate future populations.

Detailed spreadsheets indicating potential community impacts in 10 years (2010) and at build-out for EOE, town, and MAPC population projections are included in Appendix 8-1.

Table 8-5 summarizes the spreadsheets and describes the potential need for additional services, based on existing per capita ratios, and the additional infrastructure in ten years and at build-out in order to keep the same level of services. The needs are based on existing conditions. In the case of conservation land, for example, the amount of additional land indicated at the ten-year and buildout range assumes that the ratio of people to conservation land in Boxborough remains constant. The buildout numbers will vary, depending on which buildout information is used.

Table 8-5: Additional Services Needed in 10 Years and at Build-out

	Boxborough Per Capita 2000 Existing Conditions	Additional Services/Personnel in 10 Years	Additional Services/Personnel at Build-out Range
Classrooms	20 Students/ Classroom	7	11-29
Teachers	14 Students/Teacher	10	13-40
School space (in square feet)	119 Sf/ Student	16,967	22,084-66,938
Library Books	5.87 Books per Capita	8027	12,129-14,840
Conservation/Municipal Land (in acres)	270 Acres /1,000 Population	371	564-685
Police Officers	2.05 Officers/1,000 Population	3	4-5
Police Vehicles	1.03 Vehicles/1,000 Population	1	1-2
Police Facility Space (in square feet)	944 Sf/1,000 Population	1,293	1,635-2,390
Fire Personnel	.82 Fire Personnel/1,000 Population	6	7-8
Fire Vehicles	.62 Vehicles/1,000 Population	1	1-2
Fire Engines	1.03 Engines/1,000 Population	1	2-3
Fire Facility Space (in square feet)	66.76 Sf/1,000 Population	1,300	1,644-2,403
Ambulances	1 Ambulance/30,000 Population	0	0
Town Hall Employees	13 FT/2 PT Employees	3	3+

Source: See Appendix 8-1

Additional Municipal Water Use, Sewer Generation and Waste Generation

		10 Year	Build-out Range
Water Use (in gallons per household per day)	270 gallons/household/day	51,000	199,637-271,080
Sewer Generation (in gallons per household per day)	270 gallons/household/day	78,334	226,671-298,114
Municipal Waste Generation (in tons per day)	.000647 tons/day	.89 tons	1.35-1.49

Source: See Appendix 8-1

As indicated by the build-out statistics, as development occurs, open space will need to be preserved and recreation lands will be needed, in addition to a demand for other municipal services and facilities. The ten-year and build-out range for acres of conservation land shows the additional acres needed if the ratio of people to conservation land is to remain the same. The estimates provided herein will help to anticipate these demands so that Boxborough can attempt to maintain the current or acceptable levels of service.

The impacts estimated as part of this study are based on existing levels of service projected over the anticipated growth. The estimated costs are based on the number of residential housing units. These figures can be adjusted in the future by considering, for example, the assumptions on which the calculations were made, as well as the existing ability of a particular facility or service to absorb some of the projected growth. See Table 8-6.

Table 8-6: Costs of Community Services

	10 year need	cost	Buildout Need	cost
POLICE				
Officers	3	\$120,000	4 to 5	\$160,000-\$200,000
Patrol Cars	1	\$25,000	2 to 3	\$50,000-\$75,000
Facility Space (SF)	1,293	\$103,440	1,635 to 2,390	\$130,800-\$191,200
FIRE				
Personnel	6	\$240,000	7 to 8	\$280,000 - \$320,000
Vehicles (non-engine, non-ambulance)	1	\$25,000	1 to 2	\$25,000 - \$50,000
Engines	1	\$300,000	2 to 3	\$600,000 - \$900,000
Facility Space (SF)	1,300	\$104,000	1,644 to 2,403	\$131,520 - \$192,240
EMS Vehicles (ambulances)	0	\$0	0	\$0
SCHOOLS				
Teachers	10	\$300,000	27 to 40	\$810,000 - \$1,200,000
Space	16,967	\$1,357,360	46,811 to 66,938	\$3,744,880 to \$5,355,040
LIBRARY				
Books	8,027	\$160,540	12,201 to 14,840	\$244,020 - \$296,800
General Government				
FT Employees	3	\$127,500	6	\$255,000
Assumptions: (Not adjusted for inflation)				
Police Officer Salary	\$40,000			
Police Cruiser	\$25,000			
Firefighter Salary	\$40,000			
Fire Engine	\$300,000			
Fire (other vehicles)	\$25,000			
Ambulance	\$45,000			
Teacher Salary	\$30,000			
Building Space (psf)	\$80			
Library Books (average)	\$20			
General Government	\$42,500			
	paid for			
	by user			
Solid Waste Disposal -	fees			
	paid for			
	by user			
Domestic Waste (sewage) -	fees			

Where these circumstances are known, we have adjusted the analysis to accommodate the needed level of services and facilities, as opposed to merely considering existing conditions.

It is important, however, to realize that this type of analysis is dependent on the value of homes and their subsequent tax payments. Cost of Community Services studies generally compare only the tax generation to the actual cost of providing the local services. The town uses revenues generated by sources such as State lottery. Chapter 70 school aid subsidized approximately 30% of the school operating expenses.

Education is the single greatest expense to Boxborough. In FY 2000 education made up 55 percent of the per capita expenditures in the town. Industrial development, therefore, costs substantially less, in terms of services. The estimated FY 2001 cost per student is \$5,011 for all students, \$4,365 for elementary school children attending Blanchard Memorial School. In FY 2000 Boxborough paid \$113,327 for 13 students to attend the Minuteman High School. The average number of children per household is 0.77, although new homes generally have a higher number of children per household; their average is just above one child per household. As previously mentioned, revenue from outside sources can offset the cost of services. In FY 2000, Boxborough received roughly \$1,677,031 in state and federal education aid.

The cost of providing services at build-out will vary depending on the population estimate, from EOEA, MAPC or the Town of Boxborough. Table 8-6, on the following page, contains a summary. In ten years, the additional cost per household for increases in the amount of services could be \$1,417 per household, or an additional \$2,735,340. The amount of additional cost per household at build-out varies from \$1304 to \$3288. One of the major factors regarding potential cost is the number of elementary school children. MAPC and MISER population projections indicate a decrease in the number of children, ages 14 and under, in Boxborough, from 2000-2010. Peter Ashton's projections for Boxborough schools, however, show an increase, by roughly 100 students from 2000-2010. The impact that the number of school children can have on the cost of community services can be seen in the difference between the EOEA estimate, \$1,304 per household with 1394 elementary aged children projected and the MAPC estimate, \$3,288 with 2056 elementary aged children projected. Even though the EOEA population projection is higher than the Town of Boxborough, the cost of services, due to the lower projected number of school-aged children, is lower.

There are numerous other factors, however, that will impact future household taxes in Boxborough. One of these factors is the residential versus commercial industrial tax levy. The Table 8-7 describes the amount of tax revenue collected from each class of property. Throughout the late 1990s, Boxborough has received roughly 80% of its tax revenue from residential properties and 18-19% from the commercial, industrial and personal property. In FY 2001, however, the amount of Commercial and Industrial revenue has increased.

According to the Boxborough Town Planner, in the 1980s close to 30% of the tax levy was from Industrial and Commercial uses. Since then, the trend, as demonstrated in the following table, has been a decrease in the ratio of Industrial and Commercial levies. A dramatic increase in the amount of revenue from Industrial and Commercial uses, however, is

predicted in the next few years. The construction of the Cisco site and other new commercial development is expected to reverse the ratio so that Industrial and Commercial revenues make up a larger percentage of the revenue.

The following table also demonstrates that the property tax rate has gone down as the levy for Commercial and Industrial uses has risen. Reasons for decline in Commercial/Industrial contributions in 1996 - 2000 were an increase in value of residential properties; a lack of new Commercial/Industrial construction; and the declining values of existing commercial buildings.

An increase in the Commercial/Industrial levy could impact Boxborough's cost per household. These ratios should be continually reexamined so that Boxborough can monitor its goal of achieving a balance between Industrial, Commercial, and Residential revenues.

Table 8-7: Tax Levies by Category, 1989-2001

Fiscal Year	Residential % of Total	Commercial/ Industrial % of Total	Tax Rate (\$)
1989	71.9	28.1	8.20
1990	68.9	31.1	11.60
1991	66.3	33.7	11.40
1992	67.9	32.1	13.75
1993	67.5	32.5	14.60
1994	76.1	23.9	16.90
1995	79.1	20.9	17.60
1996	81.0	19.0	18.80
1997	80.7	19.3	17.00
1998	80.4	19.6	18.50
1999	81.3	18.7	17.66
2000	81.2	18.8	16.88
2001	75.6	24.4	15.50
2002	73.9	26.1	15.47

Source: Massachusetts Department of Revenue, Division of local services, Municipal data bank/local aid, March 31, 2000

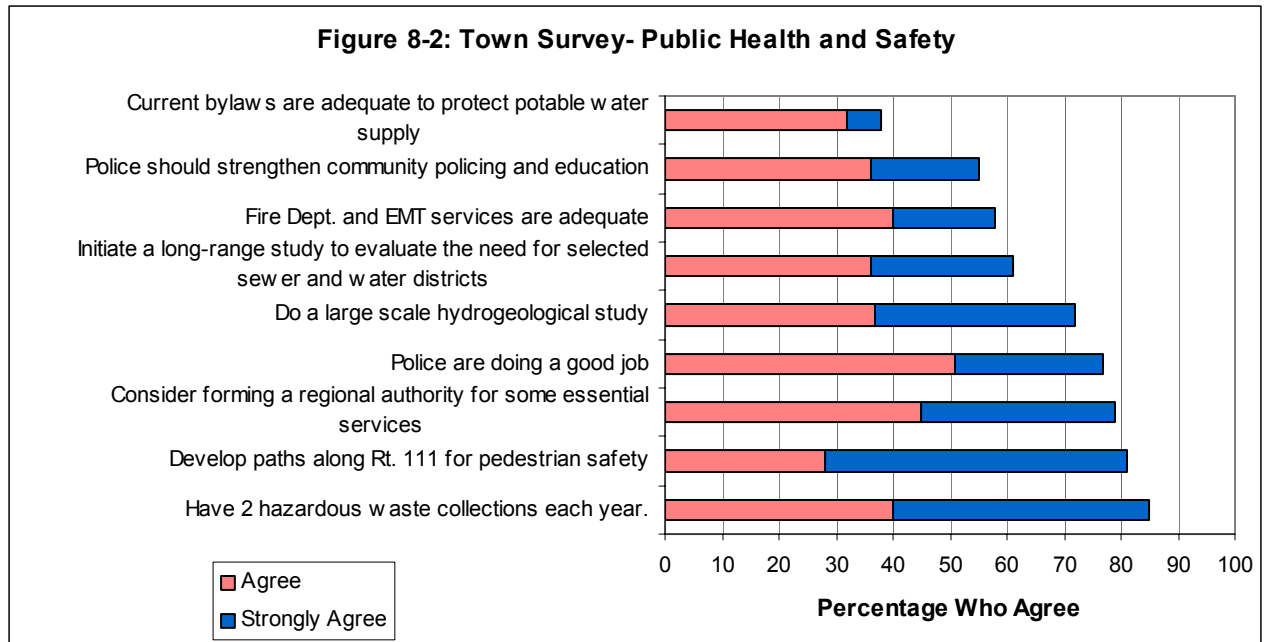
There is no replacement for department-specific planning for future needs. This study is intended to assist the community in its planning process by: 1) documenting the potential service needs caused by new residential development; and 2) placing a thumbnail estimate on costs of providing these services.

Proposed Improvements

The purpose of this following section is to document some of the areas where service and infrastructure improvements will be necessary. The 2000 Town survey, to which approximately 200 townspeople responded, suggests that the level of services, including police, fire, and Emergency Medical Technician (EMT) services, are adequate. Some of the areas indicated by respondents for further investigation include those that deal with water supply and wastewater management.

Source: Boxborough Town Survey 2000

Figure 8-2: Town Survey- Public Health and Safety



Source: Boxborough Town Survey 2000

Water Supply

The EOEIA used existing information to determine some of the potential impacts on the Town's infrastructure, including water use and municipal solid waste. According to their calculations, residential water use at build-out will probably be above 500,000 gallons per day. Including Commercial and Industrial land, water use might double that figure. Considering the impact that build-out will have on the water supply, Boxborough will have to make an investment in protecting water quality. Some options include better monitoring, with water sampling programs, Board of Health records on the location of septic systems and incidences where the systems have failed. Other options might include the development of local water systems to serve concentrations of business and commercial uses. The Town of Boxborough could also implement a comprehensive public water system. A public water system would require the development of all of the town's aquifers. Boxborough is presently engaged in studies to look at the future water needs and determine ways in which the town can meet these needs.

Wastewater Treatment

Wastewater effluent will increase at a similar rate that water use increases. To protect water quality, the formation of policies or infrastructure improvements for wastewater may become necessary. Meetings with department heads and Town Boards, where there were attempts to identify potential infrastructure improvements needed in Boxborough, have not identified the creation of a municipal sewer system as a potential improvement. There are wastewater treatment facilities in Boxborough and some of the large scale developments under construction Boxborough will have wastewater treatment facilities.

Municipal Solid Waste

Boxborough's NESWC contract will expire in May 2004. At that point Boxborough will have to decide on the future of solid waste disposal. EOEa estimates that solid waste may add 1,047 tons per year at buildout. There could be an additional 1.5-2 tons per day of residential tonnage. The various Department heads indicated that a solid waste disposal strategy needs to be developed before the contract expires in 2004.

Police

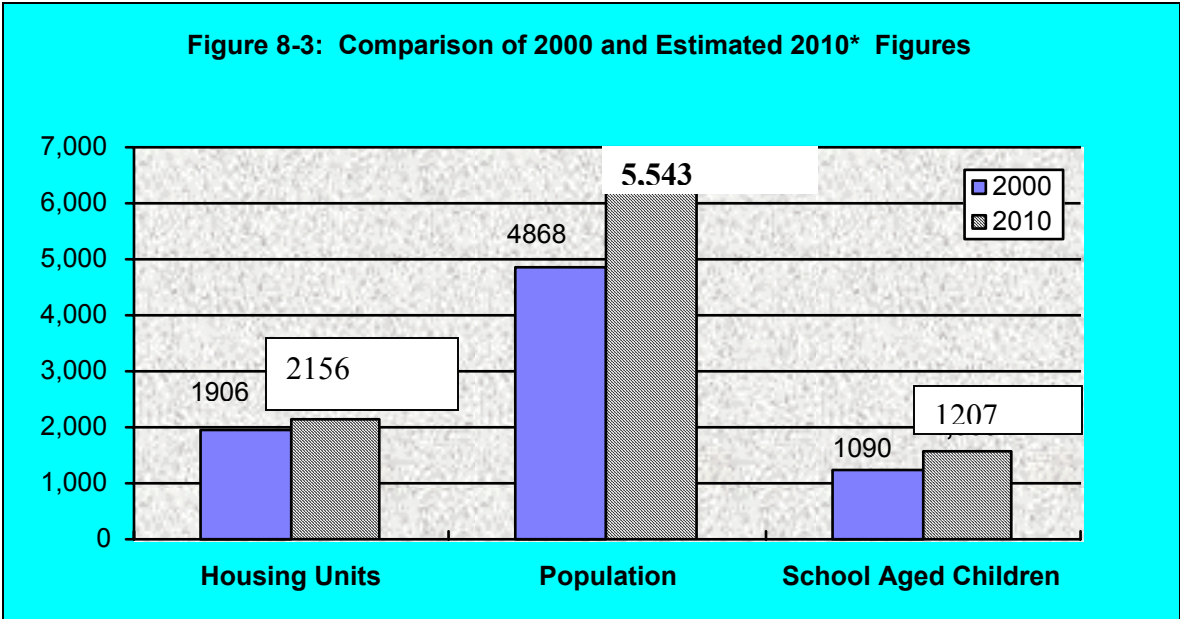
The need for police patrols increases proportionally with population increases. Boxborough's current staffing is consistent with national standards for police protection. The police department keeps records on response time, and is keenly aware of new development and/or development patterns that cause a reduction in the level of service provided.

According to the Police Chief, the staffing level is acceptable for the present conditions. The Police Department has identified the need for additional storage space for their records and was concerned about increased need for police personnel or equipment as a result of the Cisco development.

The Cost of Services tables document a need for three additional officers within ten years. Due to community size and character, it is unlikely that police sub-stations will be needed in Boxborough in the near future. Generally, Police sub-stations are required only in more urban areas for improved response time and increased police presence to heighten public safety. Our calculations indicate there is a projected need for one additional police vehicle to maintain the current service level over the ten-year horizon; vehicles will also require routine maintenance and replacement during the next decade. It is also possible that four to five additional patrol officers will be required at build-out (2020-2025) for adequate coverage and response time to the community.

Fire

Fire protection needs also fluctuate with changing population, number of households, type of structures and their locations. The estimated future number of housing units, population and school-aged children are illustrated in Figure 8-3.



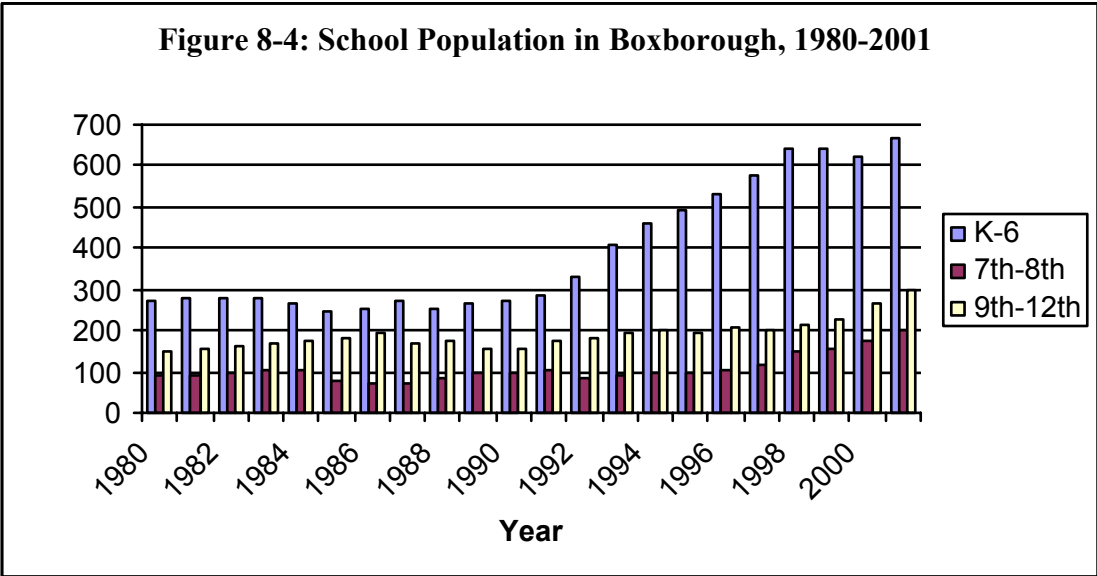
* Boxborough 2010 population t (2.7 persons per household); school-aged children based on 0.56 students per household; new construction estimated at 25 per year).

Source: EOEA and Boxborough Planning Department

Boxborough is consistent with the national standard of one ambulance per 30,000 population. At build-out, depending on the population projections used, there may or may not be a need for an additional fire person, fire engine and non-engine-non-ambulatory vehicle.

Schools

The following table describes the Boxborough School population from 1980 to the year 2000.



Source: Massachusetts Department of Revenue, Division of local services, Municipal data bank/local aid, July 19, 1999
**2001 data from the U.S. Census

School department representatives indicated that the Blanchard Memorial School was designed to accommodate 700 students. The number of students, as indicated in the preceding table, is approaching 700. At the current rate of new residential development, 2010 will be the critical year when the Blanchard School reaches critical mass.

Boxborough has proposed construction of a new school building and the retrofit of Blanchard Memorial School. The elementary school's expansion, however, is affected by its location. The Blanchard Memorial School is surrounded by wetlands and so must be served by off-site water and septic. Transportation is also an issue – there are 10 school buses and a limit on the design for the drop off point. There is also a safety issue associated with private vehicle drop-off and pick-up. The school is close to 111 and vehicle queues can extend on to Route 111. Good traffic design, therefore, is essential. Parking is also an issue at the Blanchard Memorial School; there are presently 92 parking spaces and 78 employees. The construction of a second school is on hold because the present number of students is too small to support construction of another school.

Library

Boxborough also has a high standard in terms of its public library (see Appendix 8-1). There will be a continued need to expand the library's holdings of a variety of materials and circulation. The town provides over five volumes per capita (as compared to the national recommendation of three).

Additionally, as population grows, library use will increase. More space will be needed for books and other library materials, for computer workstations, and for seating. Upgrades for current computer systems that access the Internet that serve as electronic research tools will also continue to be needed.

In 1999, the town approved a proposed new library, addressing the need for additional space, and applied to the State for funding assistance. The state, however, did not approve grant funding for the project. The proposed library has been redesigned; a revised grant application has been submitted to the state for the next round of grant funding. There has been no determination to date. The library has been designed as a one and a half story building and contains approximately 12,245 sf of space. The proposed library facility, which is in the design stage, will include a children's area, study rooms, conference and meeting rooms and computer facilities. As planned, the new library will accommodate Boxborough's library space needs for the next 10 years, if not beyond. It appears, however, that library holding should be increased to keep pace with a growing population.

Recreation

Boxborough's open lands, whether targeted for conservation, or active or passive recreation, are a critical element of community character, both physically and socially. Additional public land for parks and/or recreation will serve to help maintain Boxborough's rural character and address recreation needs if current per

capita ratios are to be maintained. Although additional public areas for active and passive recreation will be desirable as the population grows, the existing level of public lands is sufficient according to national standards. The larger issue is the need to protect open lands that provide visual relief and preserve the town's character.

Department of Public Works

The Department of Public Works has identified some current needs, including a shed for the cemetery, a holding area for tree stumps, and a storage area for road salt and sand. Maintaining roads creates a number of issues. There is the problem of how to reconcile conditions in subdivision approvals, such as no salt or sand that may conflict with DPW standard practice. The town needs a unified road salt policy that should be developed with the DPW, Planning Board and Conservation Commission. Additional roadway miles also put stress on the department and may require additional staff in the future. The DPW, however, does not have enough space to meet current needs such as space for vehicle maintenance, a shop for small construction items and larger office space.

General Government

Boxborough's growth from a small rural town to a more full service, suburban community has placed strains on town government. As a result of recommendations put forward by the Town Government Study Committee, Boxborough moved from a three-member Board of Selectmen and an executive administrator, with most offices supported by only one full-time or part-time staff member to a five-member board and a professional town administrator responsible for the daily management of town operations under the board's purview. The growth in population and development has made it exceedingly difficult for the town's limited staff to manage daily workloads. It is the complexity of the staff and board work, as well as the volume that has changed in the last five years. The Planning Board, for example reviewed 8 developments in 1996, and 13 in 2001 of which 750,000 square feet was commercial development. Five of the building permits issues in 2001 were for commercial development; in 1996 there were none. These Planning Board and building permits take more staff time and coordination and often require technical expertise of consultants. The complexities of technology and requirements for reporting have also changed increasing the need for more physical space. Finally, because Boxborough is a small community, many staff perform a variety of functions. When an individual is ill or a position is vacant, the work is distributed among other staff, thereby increasing their workloads. Further, additional staffing and services have led to an increased need for record storage and staff office space. Some Town Hall employees indicated the following:

- The need to keep current with technology regarding tax collection.
- What will the impact of Cisco be in terms of added work? Will it spur other development and demand for other amenities?
- There is more land for sale now and more inquiries from appraisers.

- Will a personnel specialist be needed? There are more demands about insurance and human resource issues.
- Information Technology Specialist, perhaps shared with the School Department, to manage the town's new geographic information system (GIS) that will be in greater demand.
- Increased volume of Town Hall transactions in every department.
- Need for conservation specialist.
- Need for a budget officer.

Social Services

The senior population in Boxborough is growing rapidly. Some of the needed services include transportation, a senior center and outreach programs for shut-ins.

Technology Infrastructure

The Town of Boxborough is attempting to stay current with technological infrastructure. The electronic network in Town Hall is almost fully complete and staff will soon have access to the Internet and email, which will allow them to better serve the public's needs. Along with new software applications and hardware in Town Hall, the Police Department, the Library, and the school, this has given rise to the need for a town-wide Information Technology (IT) Specialist to provide routine maintenance, networking, and emergency services. A new committee, BIT.com, was formed this past year to advise the town on all aspects of information technology and in developing and implementing technology strategy for the town.

Cisco's 1.4 million square foot development

As part of the information gathering process, interviews were conducted with department heads to discuss the impact of the Cisco development. They expressed concern about:

- Increased need for fire and police
- Road maintenance necessitated, if Cisco conveys the road to the town.
- Pressure for commercial services to serve the employee population
- Pressure for increased residential growth

According to the April, 2001 Notice of Project Change, Cisco is authorized for 416,200 gallons of water per day, which includes 97,200 gallons per day of potable water from a bedrock water supply well. They estimated a discharge of less than 80,000 gallons per day of treated effluent from the wastewater treatment facility. These water and sewer use estimates are in addition to the increase in water use from additional residential development. The Cisco development will also have a substantial impact on the town's roadways, which will be discussed in the next chapter.

CONCLUSION

As a final note, development of a different mix of residential and business uses in Boxborough would adjust the projection of build-out and its costs. However, since actual construction is based on market conditions and other factors, it is assumed that the number of housing units coming on line each year will be primarily traditional single family homes as has been experienced in the past. The development of additional units for seniors, or smaller apartments and condominiums that are targeted at households with no children, does not generally increase the cost of community services on a per unit basis. Similarly, an assisted living type facility would bring a potential increase in medical and other protective service needs without increasing school costs.

The costs presented in the master plan should be considered as guidelines for planning for growth. As information is updated in terms of the costs of services and build-out demands through time, these figures can be adjusted utilizing the spreadsheets developed for this purpose.

Boxborough residents have come to expect a certain standard of service that should not deteriorate simply because more people move to town. Much of the background information related to these services is documented throughout this plan. Boxborough is in the process of planning its future; this portion of the master plan represents one element of the planning process. The cost of community services analysis should be used, along with the build-out as a summary of existing service levels, and to roughly estimate future levels of service and their costs. The figures in this chapter were compiled in a way that facilitates adjustments to the analysis, making it a flexible, rather than static, planning tool. The tables presented herein are a product of data analyzed in a Microsoft Excel spreadsheet. This file has been provided to the community to allow future updates.⁷

⁷ The Excel workbook provided herein is proprietary and is offered for use by the Town of Boxborough only; for any other use, please contact the author.

CHAPTER 9 TRAFFIC AND CIRCULATION

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TRAFFIC AND CIRCULATION

INTRODUCTION

Traffic and circulation in and around Boxborough must be considered in the context of a regional setting. Boxborough is bordered by the towns of Littleton, Stow, Acton, and Harvard on the north, south, east, and west, respectively. Boxborough is under the jurisdiction of the Metropolitan Area Planning Council (MAPC), which is a member of the Boston Metropolitan Planning Organization (MPO), the regional transportation coordination committee. It is through the Boston MPO that federally funded transportation plans and programs are carried out. Boxborough is also a member of the Minuteman Advisory Group on Interlocal Coordination (MAGIC), which represents twelve towns in the northwest suburbs of Boston. Boxborough is also served by the Massachusetts Bay Transportation Authority's (MBTA) commuter rail service via the Fitchburg line with nearby station stops in both Littleton and Acton. The Fitchburg line connects Boxborough to Boston's North Station. Boxborough does not receive regional commuter bus service at this time. With limited access to public transportation and the rural character of its roadways, Boxborough must focus on meeting the transportation and circulation needs of its residents and businesses. The following are the goals and objectives for traffic and circulation.

GOALS AND OBJECTIVES

Goal	Provide a safe and convenient circulation system, which includes roads, bike paths, sidewalks, and trails.
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Objective Provide safe areas for recreational activities as well as alternate modes of transportation.

Goal	Improve operations and safety at Blanchard Memorial School driveways.
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Objective Increase the parking capacity at the school and/or the Boxborough Fire Station and encourage more efficient usage of available parking.

Objective Prevent blockage of Route 111 through traffic by vehicles entering the school grounds.

Goal	Protect the safety, convenience, and welfare of the inhabitants of Boxborough by regulating the laying out and constructing of ways in subdivisions.
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Objective Provide a local road network that can safely accommodate the demands of vehicular and pedestrian traffic and allow for town services and emergency response to be carried out quickly and effectively.

Goal	Develop property in coordination with existing roadways to provide through roadways to improve traffic flow and ease of town services.
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Objective Provide a logical local road network to help meet the previous goal.

Goal	Continue to require developments to provide roadway improvements to mitigate traffic impacts and avoid diversion of development traffic to town roadways.
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Objective Mitigate all impacts of future developments to maintain existing roadway operations.

Goal	Closely monitor local intersections as developments progress to identify and resolve traffic delays and safety deficiencies.
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Objective To determine if traffic projections developed during the planning stage reflect actual trip generations and traffic patterns after construction and if project mitigation is appropriate for the actual conditions.

Goal	Assess the need for additional sidewalks as commercial and intense residential developments are reviewed.
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Objective Ensure that sidewalks are installed at needed locations to provide for safe pedestrian travel.

EXISTING CONDITIONS

The major automobile access routes serving Boxborough are Route I-495, a six-lane limited-access interstate highway; Route 2, a four-lane limited access state highway; and Route 111, a two-lane state arterial roadway. Route I-495 is the outer circumferential

highway surrounding Boston and provides roughly north-south access through Boxborough with interchanges at Route 111 and Route 2, both of which provide east-west access. The first traffic signals have been installed in Boxborough as part of the mitigation for the Cisco New England Development Center Campus project just west of I-495. This project alone includes approximately 900,000 square feet of office/research and development space with the potential for another 500,000 square feet, generating over 10,000 vehicle trips per day. Large-scale developments of this nature will likely shape the transportation future of Boxborough and its surrounding communities as they work to attract development to establish a broader tax base. For this reason, careful review of these projects through the planning process will be required to ensure the traffic impacts are properly mitigated.

Inventory of Roadways

The roadways within Boxborough are categorized as arterial roads, collector roads, or local access roads. Arterial roads are inter-regional roads providing access between towns, counties, and urban centers. Interstate 495 and Route 2 are classified as principal arterials and Route 111 is classified as a minor arterial road. Collector roads provide access between the arterial roads and the local access roads. The collector roads for the Town of Boxborough include: Burroughs Road, Flagg Hill Road, Hill Road, Littlefield Road, Old Harvard Road, Pine Hill Road, and Swanson Road. The remaining roadways are classified as local access roads and serve to provide access to business and residential property. See Appendix 9-1.

There are approximately 36 miles of roadway in the town of Boxborough excluding portions of I-495 and Route 2, which combine for almost four additional miles of roadway. The majority of roadway is reported as being in good condition with only 4.4 miles reported in fair condition, and 2.8 miles in poor condition. The roads identified as being in poor condition include the through-roads of Cunningham Road, Davidson Road, Old Harvard Road and the dead-end streets: Barteau Lane, East Whitcomb Road, Littleton Road, and Wetherbee Lane.

Town road miles have increased 16% since 1990, resulting primarily from new subdivisions. Many of the new subdivision roadways constructed within town have been cul-de-sacs, as these are favored by builders and residents; however, cul-de-sacs are problematic for many town services, including fire, school buses, and snow plowing.

Roadway Capacity

All roadways, with the exception of I-495 and Route 2, are two-lane roadways. The remaining roads within town, except Route 111 and Liberty Square Road, are predominantly narrow, winding roads and are not experiencing significant traffic volumes or delay with all roadways operating at acceptable levels of service at this time. Capacity problems are primarily centralized at the interchange of I-495 and Route 111. The first traffic signals in town have been installed at the intersection Codman Hill Road and Swanson Road, with Route 111 as part of the mitigation for the development of Cisco's New England Development Center. Further information about proposed roadway improvements in town is presented in later sections.

Accident Data

Records for motor vehicle accidents were obtained from the Massachusetts Highway Department for the past three years. These data show that between January 1, 1997 and January 1, 2000 there were 182 accidents in the town of Boxborough; however, no individual intersections within the town are experiencing safety problems at this time, with the possible exception of the interchange of I-495 and Route 111. The majority of the accidents within town occurred on I-495 and Route 111. Accidents occurring on I-495 accounted for just over 37% (68 of 182) of the total number of accidents. This high percentage is due to the sheer volume of traffic on I-495 and not a result of safety problems. Accidents occurring on Route 111 accounted for nearly 30% (54 of 182) of the total number of accidents with 35% of these accidents occurring at the interchange of Route 111 and I-495. Potential safety problems at this interchange should be addressed by the traffic signals to be installed as part of the mitigation for the Cisco Campus.

Traffic Volumes

The Massachusetts Highway Department (MHD) maintains a permanent traffic recording station (Station 4010) on I-495 south of Route 111 in the town of Boxborough. Annual traffic volumes for the last ten years are listed in Table 9-1.

Table 9-1: MHD Traffic Volumes

Year	Volume	Difference
1990	59,211	
1991	68,000	+15%
1992	79,000	+16%
1993	66,000	-16%
1994	81,000	+23%
1995	70,000	-14%
1996	57,900	-17%
1997	74,800	+29%
1998	82,100	+10%
1999	69,900	-15%

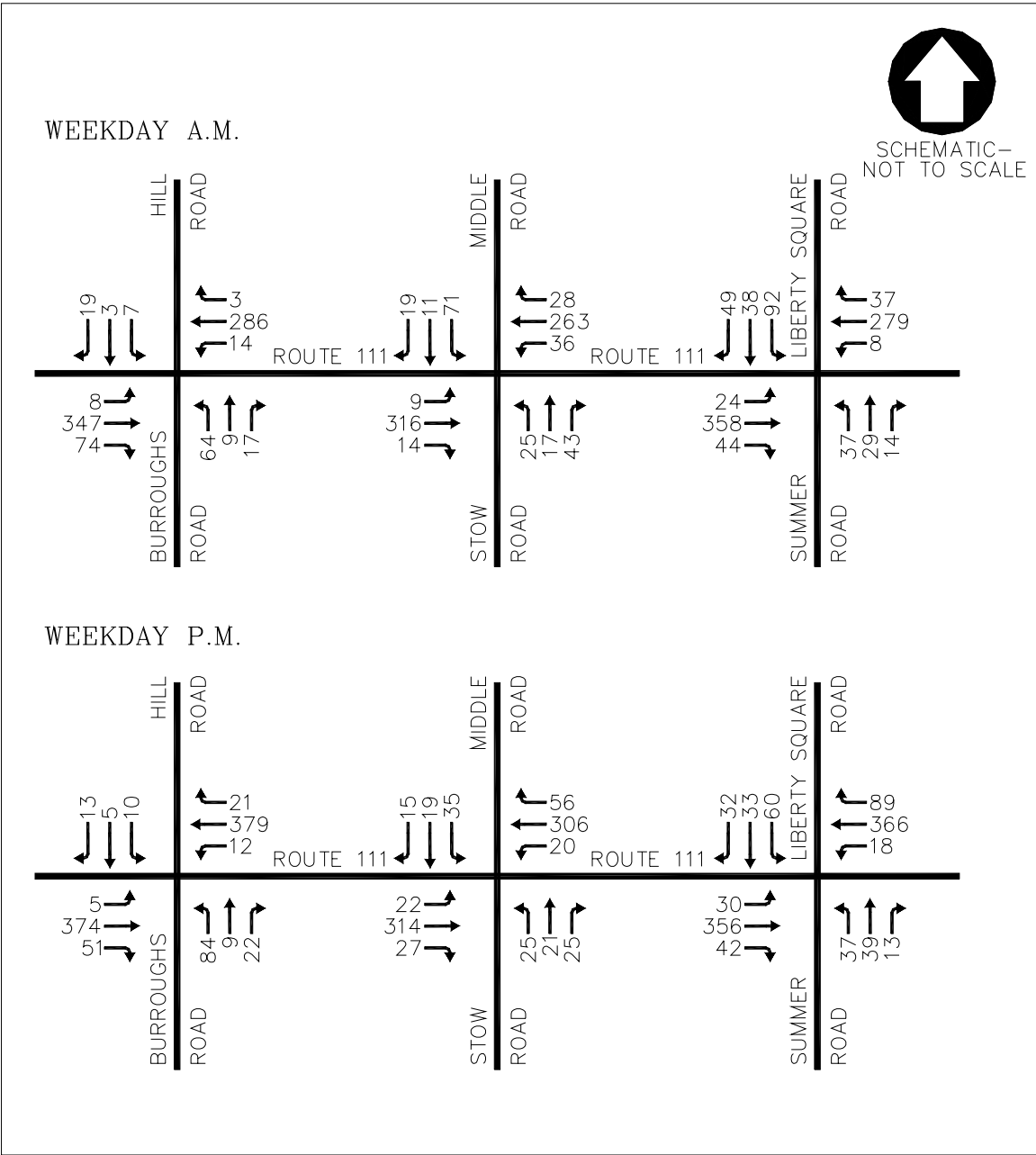
Source: MHD

As shown in the above table, the annual percentage changes fluctuate randomly and do not reflect the actual growth occurring in the town of Boxborough. It is unlikely that the traffic volumes have actually followed this pattern. While no explanation is available for the pattern, it is expected that there are errors in the data. In addition to this data, traffic counts have been conducted as part of independent traffic studies completed for area developments. Independent traffic counts were conducted in 1989, 1996, and 1999. Unfortunately, traffic studies completed by independent consultants also do not appear to reflect an accurate history of traffic volumes within the town. Daily traffic counts included in the 1989 and 1999 studies indicate a decrease of 17% in traffic volumes on Route 111 from 1987 to 1999. Although an exact reason for the decrease is not identified, it was speculated in the traffic study that it was due to a decline in the high occupancy rate and high density use of the commercial and residential developments in the area in the late 1980's. Still other independent counts conducted in 1996 indicate a

daily volume 24% lower than the 1999 daily volume. Due to the inconsistencies in the historical traffic volume data available for the Town of Boxborough, it is impossible to determine a historical pattern for traffic volumes.

Additional traffic counts were conducted as part of this master plan during the peak hours at three intersections along Route 111. These intersections were with Burroughs Road and Hill Road, Stow Road and Middle Road, and Liberty Square Road and Summer Road. The existing peak hour traffic volumes are included in Figure 9-1.

Figure 9-1: Existing Weekday Peak Hour Traffic Volumes



CURRENT PROJECTS

Development Projects

Boxborough is currently experiencing significant office development within town. Of this development, the potential 1.4 million square foot Cisco New England Development Center is the largest and most significant in town due to the traffic

volumes and the associated roadway improvement project. The following is a list of known development projects:

Table 9-2: Development Projects

Project	Location	Description
Cisco's New England Development Center Phase I	Swanson Road	900,000 s.f. office/R&D/ light manufacturing
Cisco's New England Development Center Phase II	Swanson Road	500,000 s.f. office/R&D/ light manufacturing
200 Codman Hill Road	200 Codman Hill Road	100,000 s.f. office
340 Codman Hill Road	340 Codman Hill Road	33,600 s.f. office
Cisco Systems	Route 111 between Adams and Burroughs Roads	300,000 s.f. office (re-use)
Boxborough Executive Center	Route 111 near Cunningham Road	245,000 s.f. office
Holiday Inn Expansion	Adams Place	60-room expansion
Central Street Office Expansion	80/90 Central Street	175,000 s.f. office expansion

These projects combined will add over 2.25 million square feet of office space within the Town of Boxborough, which could result in approximately 18,000 additional vehicle trips per day on area roadways. While it is anticipated that the majority of these trips will be concentrated to and from Route I-495 and Route 2, local roadways, particularly at the interchanges with I-495 and Route 2, will be affected by this increase in traffic volume. The mitigation associated with these development projects should be carefully reviewed and monitored as these developments move forward to ensure that the access to the regional roadways remains acceptable to minimize traffic diversions to local streets. Particular attention should be paid to the interchange of Route I-495 with Route 111 in Boxborough and the interchange of Route 2 with Taylor Street in Littleton. Congestion at these locations is most likely to cause a diversion of traffic to local streets in order to avoid delays.

Transportation Projects

There are no current publicly funded transportation projects within Boxborough; however, there is significant roadway work being constructed as mitigation for the commercial development projects. Cisco Development Partners-NEDC, LLC is making improvements along 2,885 feet of Route 111 as mitigation for 900,000 square feet of development approved as Phase I of their New England Development Center (NEDC) Campus. The roadway and traffic mitigation measures committed to the town of Boxborough by Cisco Development Partners include roadway widening and the installation of three coordinated traffic signals on Route 111 at the intersections with the I-495 northbound ramps, the I-495 southbound ramps, and Codman Hill/Swanson Road. This project will also realign Codman Hill Road to minimize the offset from Swanson Road. Detailed analysis of this project is included in the traffic study and Environmental Impact Report for the Cisco Development project. It is expected that this project will mitigate the traffic impacts from Phase I of the Cisco Development.

Prior approval was also given for the installation of a traffic signal and some minor roadway widening as mitigation for the Boxborough Executive Park office development. This project would also close the Cunningham Road access to Route 111 and convert Adams Place to right-in/right-out operation only. Final design of these improvements should be coordinated closely with the Cisco improvements to ensure this area operates efficiently.

Cisco Development is currently seeking approval for Phase II of their New England Development Center project. This project, which adds 500,000 square feet of space to their currently approved 900,000 square feet, does not propose any additional improvements at the Route I-495 interchange, but does offer to fund improvements along Route 111 east of I-495 at the intersections with Middle/Stow Roads, Hill/Burroughs Road, and Liberty Square/Summer Roads. The improvements recommended at these locations include re-striping, minor widening, and improved street lighting. Aligning Liberty Square and Summer Roads to reduce or eliminate the existing offset is also identified as a potential improvement; however, land takings would be required to construct this improvement and it may be more practical to increase the offset of these roads. Any of the improvements along Route 111 will benefit operations and safety at these locations, but Boxborough residents will still experience increasing delays during the peak hours at the unsignalized intersections with Route 111 as a result of traffic volume increases from the development projects.

As stated earlier, in order to minimize the presence of the commercial development traffic on roadways other than Route 2 and Route 111, the interchanges providing access to these regional roadways must operate at acceptable levels. Although significant improvements are being constructed at the interchange of Route I-495 with Route 111, it is expected that the improved roadways will be at or near capacity by the year 2006. Additional improvements at this interchange are constricted by the width of the existing bridge crossing Route I-495. As a result, in order to increase capacity at this interchange, major construction projects that would involve widening the bridge over I-495 or constructing additional ramps to I-495 may be warranted with additional development.

While there are no other existing operational deficiencies or planned roadway improvements within town, there are some improvements that should be considered. In addition to the minor improvements at the intersections along Route 111 included in the Cisco Project, the easterly intersection of Route 111 and Burroughs Road currently meets at an acute angle with poor sight distance and would benefit from realigning Burroughs Road to meet Route 111 nearer to a ninety-degree angle. Also, secondary intersections in town, including the intersection of Picnic Street and Hill Road, may benefit from various improvements. These improvements may involve increasing sight distance, beautification projects, or traffic calming elements, such as small roundabouts.

As development in town advances, traffic volume increases and safety issues may warrant improvements at these secondary locations or traffic calming measures at these or other locations. Traffic calming consists of geometric modifications and roadway control modifications that are intended to accomplish the following goals:

- Control vehicular traffic by altering roadway characteristics through physical or psychological measures.
- Promote safe and pleasant conditions for motorists, bicyclists, and pedestrians.
- Improve neighborhood livability.

There are a number of traffic calming measures that can be implemented to achieve the desired modifications in driver behavior. A summary of the more common applications is included in Table 9-3. This table is not intended to be an exhaustive list and additional information regarding traffic calming and examples of their applications is available through the Institute of Transportation Engineers at their web site at www.ite.org/traffic.

Table 9-3: Summary of Traffic Calming Measures

Traffic Calming Measure	Description	Advantages	Disadvantages
Speed Humps	Rounded raised areas of pavement across the travel lanes	Low cost; Reduces speeds	Difficult to construct accurately; Potential noise increase; Increased maintenance; Slight impact to emergency response times
Speed Tables	Flat topped raised area of pavement across the travel lanes	Reduces speeds; less jarring than speed humps; Ideal for use with crosswalks	More expensive than speed humps; Potential noise increase; Increased maintenance; Slight impact to emergency response times
Raised/Textured Crosswalks	Essentially speed tables with crosswalk markings	Reduces vehicle speeds; Increases awareness of pedestrian crossing	Potential for slight noise increase; Increased maintenance; Slight impact to emergency response times
Raised Intersection	Entire intersections that are raised three to six inches above adjacent street grade	Reduces vehicle speeds through intersection; Increases awareness of intersection and pedestrian crossings	Expensive to build and maintain; Potential noise increase; Slight impact to emergency response times
Traffic Circles/Roundabouts	Raised islands usually placed in the center of intersections	Reduces vehicle speeds; Reduces accidents by reducing right-angle conflicts	Increases difficulty for left turns for trucks and emergency vehicles; May reduce adjacent parking; Potential increase in pedestrian and bicycle accidents
Medians (Center Lane Narrowing)	Raised island installed on the centerline of a two-way road to reduce lane widths in both directions	Low cost; Reduces vehicle speeds; Can accommodate pedestrian crossings; Landscaping possibilities	May decrease adjacent parking; May increase pedestrian and bicycle accidents due to reduced shoulder
Chokers/Neckdowns/Bulb-outs	Bump-outs of the curb line to narrow the roadway at intersections or mid-block	May reduce vehicle speeds; Improves pedestrian safety	When used in one direction only may force drivers towards oncoming traffic; May effect drainage

Chicanes	Redesign of straight sections of roadway to include narrow landscape encroachments to create a slalom effect	Reduces vehicle speeds and volumes	Reduced roadway capacity; Cost; Maintenance; May impact drainage
Neckdowns	Curb extensions at intersections that reduce the roadway width and tighten the curb radii at the corner.	Improves pedestrian safety, Provides landscape opportunity	Cost; Maintenance; May impact drainage
Street Closures	Closure of through street with physical barriers	Eliminates all cut-through traffic; May reduce speeds; Provides landscape opportunity	Restricts access for residents; Restricts emergency access; May cause diversion of cut-through problem
Directional Restrictions	Closure of one half of a roadway with physical barriers across one lane	Eliminates specific cut-through traffic; May reduce speeds; Provides landscape opportunity	Restricts access for residents; May require enforcement; May cause diversion of cut-through problem
Forced Turn Islands	Physical barrier to prevent or force movements (i.e. right-turn only)	Eliminates specific cut-through traffic; May reduce speeds; Provides landscape opportunity	Restricts access for residents; May require enforcement; May cause diversion of cut-through problem
Psycho-perceptive	Pavement markings or roadside treatments to make the roadway seem narrower than it really is	No physical impacts to roadway; May be low cost	Effectiveness in questions
Textured Pavement	Brick, textured concrete or cobblestone roadway surface treatment	Increases driver awareness	Maintenance costs; Increased noise
Deflector Islands	Raised island encroaching on the through lane forcing vehicles to divert from a straight path	Reduced speeds; May provide pedestrian refuge; Provides landscape opportunity	Cost; May impact drainage

Transit Projects

The Fitchburg Commuter Rail Line that serves Boxborough and the surrounding communities is limited by the lack of available parking at its stations. There are only 1,330 spaces available on the entire Fitchburg line, while the recently constructed Old Colony Commuter Rail Lines to Middleborough and Plymouth have 2,479 and 2,653 spaces, respectively, exclusive of the stations north of Braintree, with plans to expand parking further. The availability of parking on the new Old Colony Line has likely been one of the key factors that have led to ridership numbers well in excess of those experienced on the Fitchburg Line. This comparison highlights the need for sufficient parking for the commuter rail to be successful.

In an effort to begin to address the parking shortage on the Fitchburg Line, the MBTA is proposing to relocate the commuter rail station in Littleton to provide additional parking. MassHighway is currently preparing to file an Environmental Notification Form (ENF) for this project; however, the site that is preferred by the residents of Littleton has raised significant environmental concerns related to wetlands and wildlife that may make this location unacceptable.

It should be noted that the impact of the commuter rail system on the Town of Boxborough is likely to be minimal. Based on the 1990 census data, only 18 people travel to work from Boxborough via commuter rail and none reverse commute to work in Boxborough via commuter rail. These statistics may not represent current trends with the population growth that Boxborough experienced during the 1990's. The 2000 census data will need to be reviewed when available to accurately determine the need for Boxborough to pursue improvements to commuter rail service.

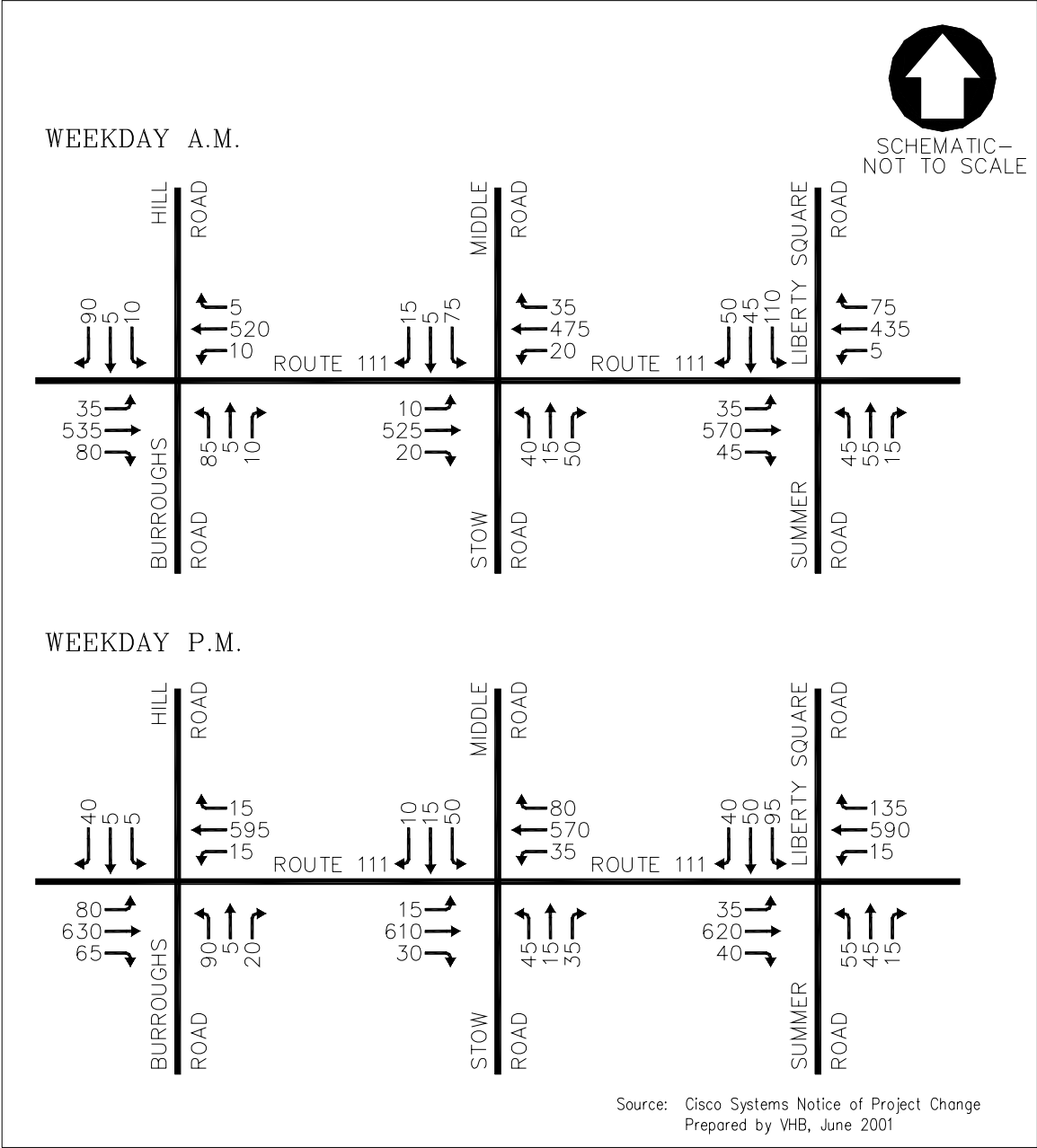
In addition to the traditional commuter rail service, projects for adding bus or shuttle service may be viable in the near future. Historically, the rural nature of Boxborough and the surrounding communities have limited the viability of bus service. However, projects utilizing existing corporate shuttle services to provide transportation to residents have been implemented on a trial basis. One such service in the Town of Maynard could serve as a model for Boxborough as the Cisco Corporate Campus is developed. Such services typically combine public and private funding and allow a more efficient use of the equipment with residents and corporate employees commuting in opposite directions. In particular, MassHighway has a Transportation Demand Management (TDM) Program that will award grants to fund these operations. Cisco had committed to a TDM program that will include a shuttle service, van pooling, carpools, etc.

ANALYSIS AND FUTURE CONDITIONS

Traffic Volume Forecast

Without a clear history of traffic volume change upon which to base a forecast of future volumes, the growth rate of the town's population was used. Based on this data, an annual growth rate of 2.5% was used for projecting future traffic volumes. In addition, traffic volumes projected for specific developments were also added to the intersections being studied. These projected traffic volumes are shown in Figure 9-2.

Figure 9-2: Projected Weekday Peak Hour Traffic Volumes



Traffic Analysis

The data from the traffic counts conducted as part of this master plan were subjected to a detailed capacity/level-of-service analysis. Level-of-service (LOS) is a measure of the intersection operating conditions ranging from A to F with A being the best and representing free flow conditions and F being the worst and characterized by excessive delays. The levels-of-service at these intersections are summarized below:

Table 9-4 Route 111 Intersections - Levels-of-Service (LOS)

		2001 LOS		2006 LOS		2011 LOS	
Intersecting Street	Time Period	Rte. 111 LT*	Side Street	Rte. 111 LT	Side Street	Rte. 111 LT	Side Street
Hill/Burroughs Roads	AM	C	E	C	F	C	F
	PM	C	E	C	F	D	F
Middle/Stow Roads	AM	C	E	F	E	F	F
	PM	D	C	E	E	F	F
Liberty Square/Summer Roads	AM	F	D	F	F	F	F
	PM	F	E	F	F	F	F

*LT = left turn

With LOS D and E being considered acceptable during peak hours, the LOS summary illustrates generally acceptable operating conditions currently experienced on local roads. However, the future conditions are forecast to degrade into unacceptable levels-of-service. Route 111 is under the jurisdiction of MassHighway and any improvements to this roadway will be the state's responsibility; however, state funding often lags behind transportation needs and it will be the residents of Boxborough attempting to access Route 111 that will suffer the delays. The Cisco development is proposing to fund minor improvements at each of these intersections consisting of minor widening, re-striping to provide left-turn lanes, and improved street lighting. While these improvements will improve safety at these locations, they will not entirely offset the projected increases in delays. The levels-of-service resulting from the addition of left-turn lanes on each of the side streets at the local intersections are outlined in Table 9-5.

Table 9-5: Route 111 Intersections – Weekday Peak Periods Levels-of-Service (LOS) With Improvements

		2001 LOS		2006 LOS		2011 LOS	
Intersecting Street		Rte. 111 LT	Side Street	Rte. 111 LT	Side Street	Rte. 111 LT	Side Street
Hill Road		A (A)	C (C)	A (A)	C (C)	A (A)	C (D)
Burroughs Road		A (A)	D (D)	A (A)	F (F)	A (A)	F (F)
Middle Road		A (A)	D (C)	A (A)	F (D)	A (A)	F (F)
Stow Road		A (A)	C (C)	A (A)	C (D)	A (A)	E (E)
Liberty Sq. Road		A (A)	D (D)	A (A)	F (F)	A (A)	F (F)
Summer Road		A (A)	D (D)	A (A)	E (F)	A (A)	F (F)

Note: - First level-of-service letter denotes morning peak hour operations; the letter in parentheses denotes afternoon peak hour operations.

- Improvements are assumed to include an additional approach lane on each side street.

The next level of improvement at these intersections would be to install traffic signals. Existing traffic volumes at these three intersections do not warrant the installation of traffic signals, however, projected volumes may meet signal warrants. The intersection of Route 111 and Liberty Square Road/Summer Road will meet the Peak Hour Volume signal warrant upon completion of the Cisco Development. This warrant is based on the volumes of the major and minor streets during the peak hour of the day. Based on the available data, this is the only intersection that will meet the warrants for the installation of a traffic signal within the next ten years. It should be noted that a thorough signal warrant analysis has not been performed; as such, an analysis would require additional traffic volume data at these intersections. Also, the intersections do not warrant the installation of signals today and only meet one warrant with projected volumes. As a result, it is not projected that signals would be installed at these intersections within the next ten years; however, changes in predicted traffic patterns from area developments could alter the traffic volumes and necessitate the installation of signals. A program of monitoring these intersections should be established as area development progresses in order to identify problems quickly and to determine the appropriate actions to alleviate congestion or safety concerns.

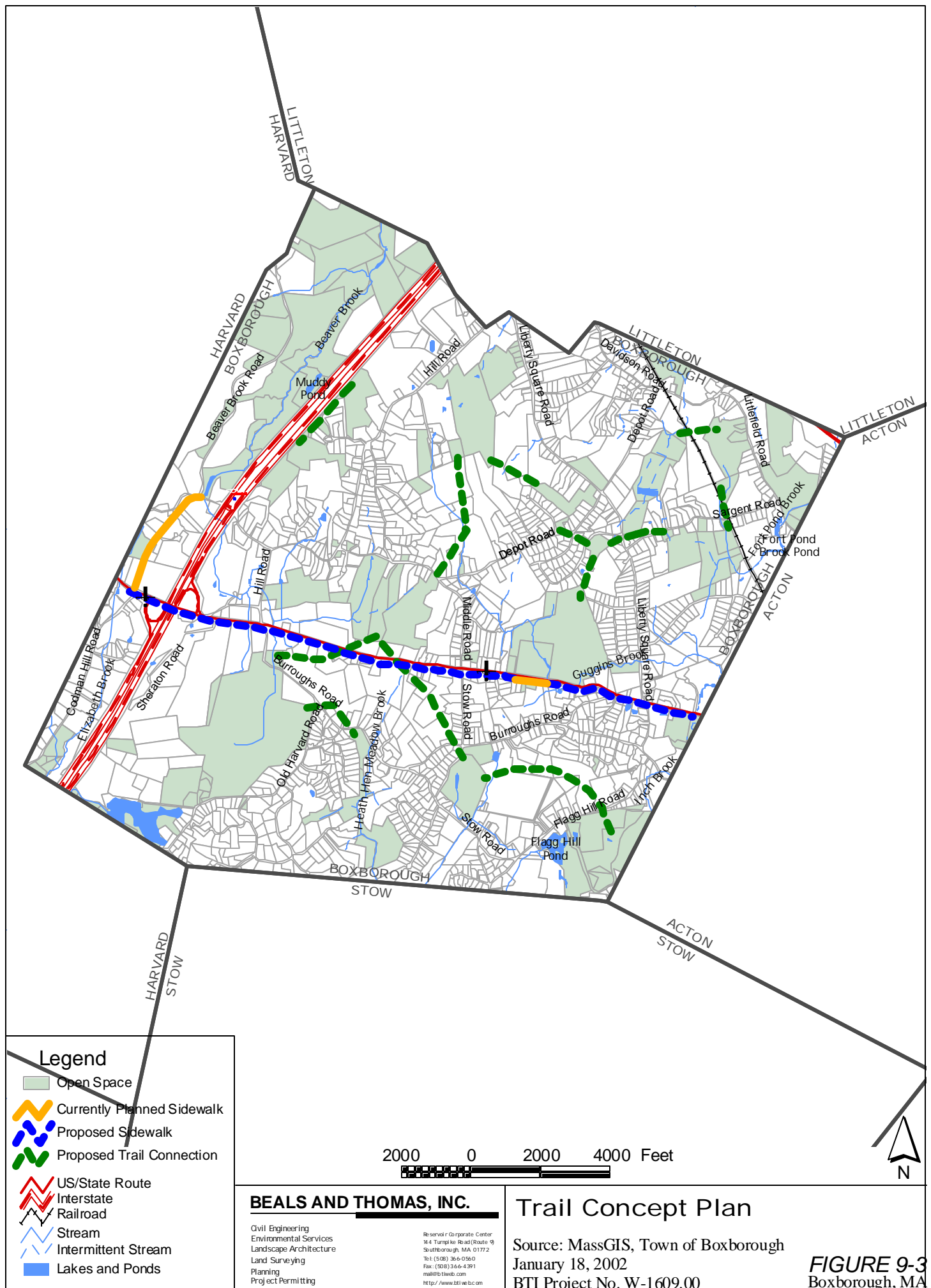
Cisco Systems will be establishing a traffic-monitoring program as part of the mitigation associated with the second phase of the New England Development Center. The monitoring program is scheduled to start upon completion of Phase II development and is currently intended to ensure that the proposed Transportation Demand Management plan is effective in reducing the number of single occupant vehicles entering and exiting the Cisco site. It has been recommended that this program be expanded to include additional town roadways to determine if the traffic patterns predicted in the Cisco traffic studies were representative of actual conditions. If Cisco Development does not commit to expanding this program, the town should work with the Regional Planning Agency (MAPC) and MassHighway to perform periodic traffic counts along Route 111 and at key intersections. The results from this monitoring program should be used to determine the ability for accommodating additional traffic along this corridor and consequently, the available capacity for additional development traffic. As additional improvements are warranted along this corridor, mitigation from proposed developments should be directed at the identified deficiencies. If proposed developments are not available to provide improvements, the town will need to work with the Regional Planning Agency to add projects to the Transportation Improvement Program (TIP).

Sidewalks/Pathways

The town currently has very few sidewalks/pathways along its roadways. The layout of the town with primarily single-family houses and low development density does not facilitate or encourage walking as a common form of transportation. Also, the lack of public transportation has resulted in an automobile dependent population, again reducing the frequency of pedestrian activity. As part of the Cisco project, there are sidewalks proposed within and around the development. In addition, there is a sidewalk currently proposed along the south side of Route 111 between Blanchard Memorial School and the Town Center (See Figure 9-3). The entire length of Route 111 should be targeted for sidewalks due to the traffic volumes and speeds along this roadway and the location of

the elementary school on this roadway. In order to maintain the town's rural character, new sidewalks should be carefully planned to promote an aesthetically pleasing design. Rather than constructing the standard asphalt sidewalk parallel to the roadway, design features such as meandering alignments and atypical surface treatments can serve to promote the rural character. A likely source of funding for the construction of proposed sidewalks within town will be through developers as additional projects are proposed.

Although additional town roadways may not currently benefit from the installation of sidewalks, as additional development occurs, particularly commercial development or more intense residential development, the project review process should include an assessment of the need for sidewalks in the vicinity of the development.



CONCLUSION AND RECOMMENDATIONS

Boxborough is on the verge of experiencing significant increases in traffic volumes as a result of regional growth and the construction of major commercial projects such as Cisco's New England Development Center campus, 90 Central Street, and the Boxborough Executive Center. The town should be proactive in determining its future character as new developments are proposed. While the Cisco Systems project will generate significant amounts of traffic, it is concentrated west of I-495 and is not projected to have a major impact on Route 111 and other roadways within town east of I-495. However, increases in delays at the interchanges providing access to the regional roadways (I-495 and Route 2) could result in diversions of traffic to roadways through town as motorists seek alternate routes to avoid delays. Also, if additional development occurs further east into town, the traffic volume increases will be much more noticeable for the residents of Boxborough.

Even without additional projects beyond those identified previously, the regional population growth will result in traffic volume increases that will lead to increasing delays and unacceptable levels-of-service at the intersections along Route 111. While this growth in population and traffic volume is not a certainty, as was experienced with the decrease in the 1990s, the possibility should be taken seriously. The town must decide what it wants its future character to be. While there will likely be pressure to provide for increased traffic volumes on Route 111, any improvements to accommodate this increased volume may lead to Route 111 becoming a more desirable route and, therefore, further increasing traffic volumes (If you build it, they will come). Regardless of the desired path for Route 111, the town should ensure that future developments fully mitigate any impacts from the additional traffic that they generate.

Of particular concern is the extensive development concentrated at the Route I-495 interchange. While this location will result in the least amount of impact on roadways within town, delays for vehicles seeking access to I-495 and Route 2 could result in diversions to town roadways. The currently proposed roadway improvements should prevent excessive delays accessing these roadways; however, there is little additional capacity available for further development or growth. Also, the proposed improvements will expand the existing infrastructure near its limit. In order to provide additional capacity at the interchange of I-495 and Route 111, major improvements would be needed, including the widening of the bridge over I-495 or the construction of additional ramps.

Widening of the bridge would allow for additional turn lanes to the ramps and increased queue storage between signals. If the traffic volumes increase to such a level that the existing partial cloverleaf ramp system is unable to meet the demands, additional ramps would be needed. While the construction of additional ramps in the southeast quadrant of the interchange has been considered and development has been avoided that prevents the construction of these ramps, the northwest quadrant of the interchange has been developed and these ramps would no longer be practical. With the majority of the current commercial office development occurring west of I-495, the northwest quadrant ramps may not be warranted, however, it is reasonable to expect that the ramps within the

southeast quadrant will be required. In order to provide the flexibility to accommodate additional development or regional growth, development should continue to be avoided in the southeast quadrant of this interchange.

In addition to mitigation projects to facilitate access to the regional roadway system, measures may be necessary to decrease the desirability of local roads for traffic seeking to avoid congested routes. Such measures may include maintaining the existing rural character of the local roadways that includes narrow winding alignments to discourage heavy through volumes or implementing traffic calming techniques to reinforce the local roadway character. Traffic calming could be used to reduce speeds and roadway capacity, while enhancing pedestrian safety and neighborhood aesthetics.

The other major factor in determining traffic volumes on Boxborough's roadways will be the maintenance and possible improvements in commuter rail service. However, based on 1990 census data, the MAGIC Subregional Area Study identified only 18 residents of Boxborough that utilize commuter rail to commute to work, and work-at-home accounted for over five times the number of workers than did commuter rail. This data would indicate that the commuter rail service in the Boxborough area is primarily used by residents of other towns. The study also identified delays, overcrowding, and a lack of parking on the MBTA's Fitchburg commuter rail line as problems with existing transit service. The MBTA's project for the relocation of the Littleton commuter rail station will serve to alleviate some local parking deficiencies, but this project is still under study and a final recommendation is not yet known. Other possibilities have included providing for a commuter rail station within the limits of Boxborough. Discussions as part of this master plan have indicated that constructing a station within Boxborough would not be desirable for the residents of the town. While it may provide easier access to the commuter rail passenger within the town, it will also attract additional vehicles to the roadways leading to the station. With the location of the commuter rail line through town, any station would be located on relatively minor, local roads that are not designed for heavy traffic volumes. In addition, the town may be subject to an increase in its MBTA assessment if a station were to be located within its boundaries.

Additional projects that may impact the town's roadway system include the Town Center project and the Blanchard Memorial School. Existing traffic deficiencies at the school result primarily from a lack of on-site pick-up/drop-off facilities that require vehicles to form a queue that often backs up onto Route 111 or to stop at the fire station located on the opposite side of Route 111. Students are then forced to cross Route 111, which necessitates the presence of a traffic control officer at the beginning and end of the school day. Improvements to the on-site facilities at or near the school would minimize the number of students crossing Route 111; however, the police detail may still be warranted in order to control vehicular traffic.

Balancing traffic and circulation needs with town character is difficult. For example, having cut-through streets may facilitate town services such as snow plowing, but do not promote small neighborhoods where children can play safely. Pathways along Route 111 may promote safety, but they must be designed to respect physical features such as large trees and stone walls within the right of way. Safe sight distance at intersections may

require street realignment. Careful planning, monitoring of traffic volumes and sensitive design with staff working closely with residents will be vital to maintaining the balance between competing interests. Chapter XI details the actions that Boxborough can take to accomplish that balance.

CHAPTER 10 REGULATORY ENVIRONMENT

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REGULATORY ENVIRONMENT

INTRODUCTION

Boxborough is a rural, suburbanizing community that is primarily residential with some working farms, small retail and service businesses. Large-scale non-residential and multi-family development is primarily found west of I-495. The few remaining farms, expanses of open fields and extensive wetlands add to the rural character of town. Since zoning was adopted in 1965, the town has continued to modify its regulations primarily to protect its water and natural resources. These resource-based controls, however, also limit the flexibility of the community to provide for other needs. This has created a “catch 22”; while the regulations allow some control of growth by placing restrictions on private development of land, they also limit the location and intensity of what would otherwise be desirable growth that might serve to expand the local tax base.

Because Boxborough has no public water supply, almost all of its drinking water comes from private wells. Protecting the watersheds of these water supplies is critical to preventing the degradation of the surface and groundwater supplies. Also, because there is no public sewer system, the need to provide private septic or wastewater treatment facilities often limits development. The cost of providing these on-site systems, combined with the need for larger lot sizes to accommodate septic systems and wells on a lot, raises the cost of development. While larger lot sizes have a positive impact by reducing the ultimate build-out of the town, these facts are particularly significant if the town wants to provide affordable housing.

Boxborough’s population is close to 5,000 and growing rapidly. Boxborough was one of the fastest growing communities in the state between 1990 and 2000. While building permits for new housing has slowed recently, during the past decade the number averaged 40 per year. This residential growth is placing new demands on the town to maintain the superior level of service of its schools, public safety, and other community services. Protection of community character remains a priority of residents. Other key issues involve the need to balance protecting natural resources and providing quality community services such as schools, recreation, police and fire while minimizing tax rate increases.

ZONING – IN GENERAL

In Massachusetts, the zoning power effectively delegates the State Police Power to Massachusetts' municipalities for the purpose of zoning, in any manner not inconsistent with State law. Since the Massachusetts Legislature first conferred zoning powers to local jurisdiction through the adoption of its first zoning enabling legislation in 1920⁸, significant changes have taken place resulting in what is now codified as the modern "Zoning Act", Mass. Gen. L. c. 40A. As is frequently noted, 1926 was the year in which the decision in the landmark zoning case *Village of Euclid v. Ambler Realty Company*⁹ was reached. This case tested the validity of zoning to separate land uses by zones (Euclidian zoning).

In Massachusetts, the new Act¹⁰ is coupled with the passage of the Home Rule Amendment to the Massachusetts Constitution in 1966. The Home Rule Amendment permits municipalities to exercise any power that the Legislature has the power to confer on them, as long as the exercise of these powers is not inconsistent with the Constitution or laws enacted by the Legislature. It should be noted that where the statute provides a protection, the municipality could provide more protection, but not less. This fact works "both ways". By way of examples, 1) a local wetlands bylaw can be more restrictive, protecting a greater resource area (as Boxborough's regulations do), but 2) where the state statute protects property owners, those rights/protections cannot be taken away; as such, a town can provide its own provisions for grandfathering lots, but the local rules cannot be inconsistent with the provisions of Mass. General Laws, section 6, which deals with vested lot status.

As noted above, the Zoning Act does enable municipalities to enact regulations that are more stringent than those adopted by the State (from a perspective of offering greater protection- focus must be given to what is being protected, e.g. resources versus property rights). The underlying goal of protecting the health, safety and welfare of citizens has been extended to many related topics such as preservation of community character, natural resources, and provision of housing for all. This is done by the implementation of zoning and other "home rule" regulations that govern the height, bulk and setback of structures; the uses allowed in a particular district; the percentage of the lot that can be covered by impervious surfaces; and a variety of other regulations such as the color of structures in the historic district or the requirement for a buffer of vegetation between different land uses.

⁸ The Zoning Enabling Act was enacted by chapters 368 and 551 of the Acts of 1954, replacing previous legislation codified in Mass. Gen. L. chapter 40 §§ 25-30B.

⁹ 272 U.S. 365 (1926)

¹⁰ Initially set forth in 1975 Mass. Acts 808 and amended through 1987 Mass. Acts 685 [Massachusetts Zoning Manual, MCLE, Martin R. Healy and Robert W. Mack, eds. 1992 supp.]

BOXBOROUGH ZONING BYLAW

A Zoning Bylaw and Zoning Map were first adopted in Boxborough in March 1965. The first bylaw was a simple one reflecting the rural agricultural landscape and a few commercial and industrial uses and districts. Since that time the town has tried to keep ahead of land use changes. Some of the key amendments since 1965 include:

- Provisions to allow lots with reduced frontage with an increased lot size (STM 1980)
- Site Plan Approval (STM 1980)
- Floor area ratio requirements for the Office Park and Industrial/Commercial Districts (ATM 1989)
- Open Space Commercial Development (ATM 1993)
- Minimum upland lot area (ATM 1994)
- Increase in the minimum lot size in the Agricultural/Residential district from 40,000 sf to 60,000 sf. (ATM 1994)
- Regulation of adult entertainment uses (ATM 1997)
- Regulation of telecommunications equipment (ATM 1998)
- Assisted Living developments (ATM 1999)
- Introduction of the Town Center District (ATM 2000)
- Prohibition of "big box" retail (STM 2000)

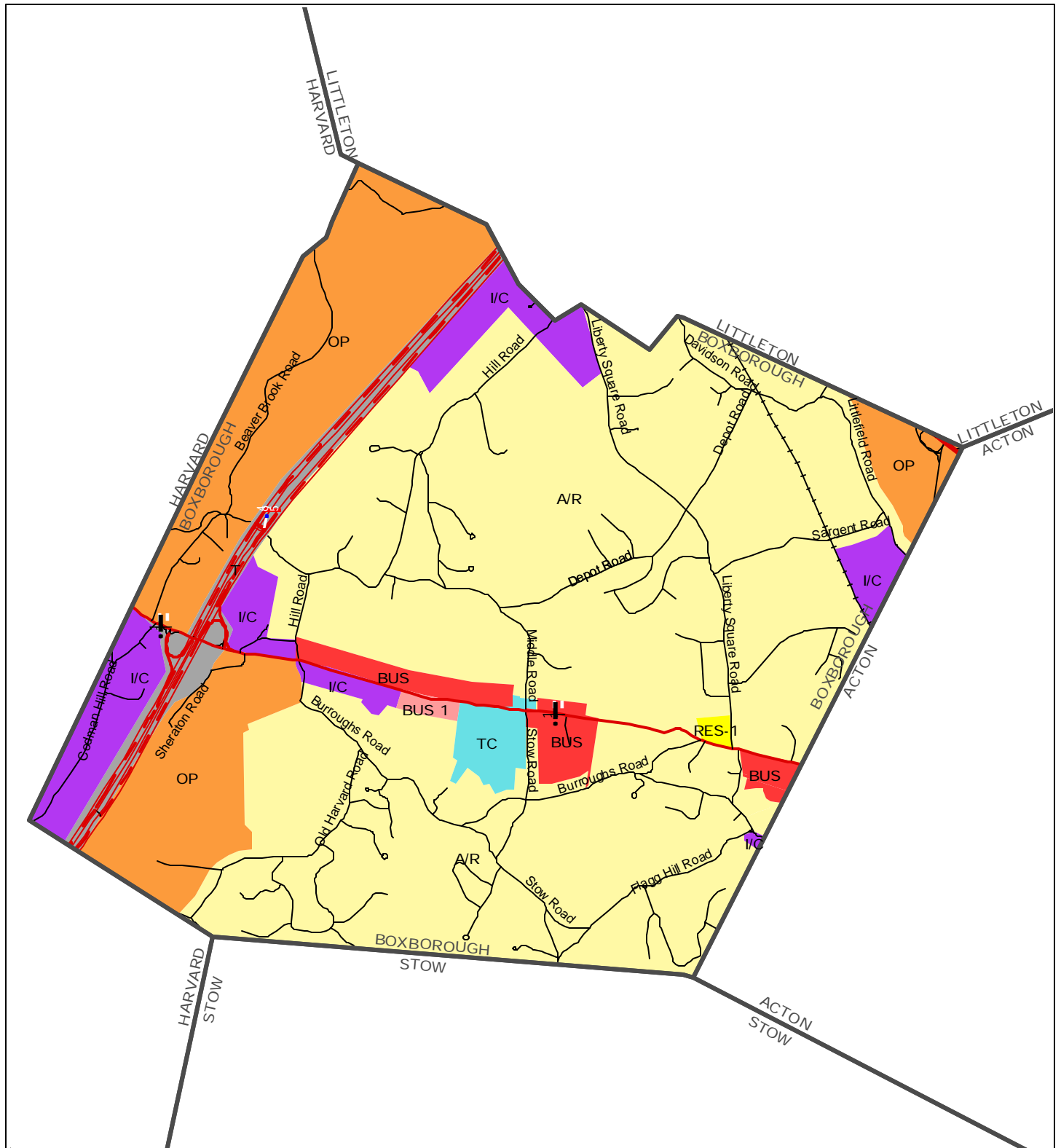
The existing zoning in Boxborough is primarily Agricultural/Residential, as illustrated in Figure 10-1. Other zoning districts in Boxborough include Business, Industrial and Town Center.

The Town Center, as a new district, is just developing as a mixed-use district. There has been some discussion as to whether other areas of town should be zoned as such, but the consensus is to wait on any additional TC rezoning until the effectiveness of the bylaw as written is illustrated by development at the cross roads of Stow Road and Massachusetts Avenue. The present zoning bylaw was reviewed in detail by the Master Plan consultant; a detailed summary of recommended consistency items was provided to the Steering Committee and Town Planner for incorporation as appropriate; the more substantive issues are summarized herein.

NON-ZONING BY-LAWS AND REGULATIONS AFFECTING LAND USE

Planning Board Subdivision Rules and Regulations

Boxborough's Subdivision Rules and Regulations were initially adopted in February 1954 and most recently amended in January 1999. These regulations, authorized under MGL Ch. 41, Sec. 81K-81GG, govern the division and subdivision of land, the design of streets and the lots along those streets, and stormwater drainage systems. Boxborough's Subdivision Rules and Regulations are more detailed than those of many other towns. A definitive Subdivision Plan must be accompanied by an environmental and traffic analysis prepared by qualified professionals. This analysis includes an evaluation of impacts on water resources, landscape (how the proposed design features are integrated



- Zoning Districts**
- Agricultural / Residential
 - Residential 1
 - Business
 - Business 1
 - Office Park
 - Industrial / Commercial
 - Transportation
 - Town Center

2000 0 2000 4000 Feet



BEALS AND THOMAS, INC.

Civil Engineering
Environmental Services
Landscape Architecture
Land Surveying
Planning
Project Permitting

Reservoir Corporate Center
344 Turnpike Road (Route 9)
Southborough, MA 01772
Tel: (508) 366-0560
Fax: (508) 366-4391
mailto:info@btinc.com
http://www.btinc.com

Zoning Map

Source: MassGIS, Town of Boxborough
May 17, 2001
BTI Project No. W-1609.00

FIGURE 10-1
Boxborough, MA

into the existing landscape to preserve and enhance aesthetic assets of the site) and the existing traffic network. In addition, the applicant must submit a Quality Control Plan (i.e., a construction management plan, prepared by a professional engineer to assure to protection of preserved site features and the completion of the construction according to the approved plan). The required street right-of-way is usually 50 ft. except for arterial streets, which are 60 ft. wide, but pavement width may vary from 20-30 ft. depending on the number of dwelling units, the roadway services and the kind of street (e.g., land, collector arterial). The Board of Health must review the drainage and septic systems and make recommendations to the Planning Board prior to plan approval. The master plan consultants also reviewed the subdivision regulations. The Recommendations section below proposes two options for discussion as alternatives to conventional subdivision: Open Space Residential Design and Rural Subdivisions in response to the Town's stated interest in preserving community character.

Board of Health Regulations

Regulations for Subsurface Disposal of Sewage were most recently adopted on October 18, 2000. The Board of Health must approve all of these systems. Inspections and witnessed field testing are performed by the Nashoba Associated Boards of Health (Nashoba), a regional health district. Nashoba also must approve the water supply to all lots. Design standards include setbacks from water courses (100 ft.), wells (100 ft.), and property lines (20 ft.). The Boxborough Board of Health also has Well Regulations that set requirements for the construction and destruction for private wells. Wells must be set back at least 100 from a subsurface sewage disposal system, 10 ft. from a property line, 35 ft. from a public way, 400 ft. from an active or closed sanitary landfill or hazardous waste spill site.

General Bylaws

Construction Site Activity

The operation of heavy construction equipment except for homeowners working on their own property is limited to 7:00 AM to 6:00 PM Monday through Saturday and is expressly prohibited on Sundays and Holidays.

Earth Removal

No earth material may be removed from a parcel of land without a written permit from the Planning Board after a hearing for which abutters within 300 feet must be notified. Such a permit is valid for up to three years, but is not transferable. The Building Inspector may approve the removal of up to 200 cubic yards of material necessary for the construction of a building, driveway or roadway, provided that no loam is removed from the town. No permit may be issued if the earth removal will endanger public safety, produce an objectionable amount of dust, will destroy unusual land features, will cause irreparable harm to wildlife or if the transportation of material will create a traffic nuisance. Restoration standards, such as grades of no greater than 1:2 slope and re-grading around wells are also set forth.

Construction within Public Ways (Roadways Openings)

A permit from the Board of Selectmen is required for anyone who intends to break into any street or sidewalk surface, construct a driveway or excavate the shoulder of a public way. The construction for such activity is prohibited from November 1 to April 15 of each year to assure that the roadway opening can be closed and patched safely without concern for cold weather conditions. Performance bonds are required for the work to assure that the site will be returned to its condition prior to construction.

Driveway Approach Bylaw

Anyone who intends to locate any fence, post, tree or edgestone so that the grade or width of the public way is changed must obtain a written permit from the Director of Public Works in the case of a single-family house, or from the Planning Board in all other cases.

Wetlands Bylaw

The Boxborough Wetlands Bylaw is similar to the Wetlands Protection Act, MGL Ch 131, (the Act) with a few differences. Unlike the Act, the Boxborough Wetlands Bylaw (Bylaw) gives the Conservation Commission jurisdiction over isolated wetlands and establishes a 100 ft. buffer around these resource areas. Furthermore, the Commission may consider recreation and aesthetics in addition to those prescribed by the Act in making its determinations.

Wetland Buffer Zone Regulations

The Wetland Buffer Zone Regulations strengthen the Wetlands Protection Act and the local Wetlands Bylaw by defining the wetland buffer zone as an area of land within 100 horizontal feet from the perimeter or outer edge of any natural or compensatory wetland. The Conservation Commission's concern is that uses or activities in the wetland buffer zone affect resource areas. Thus, underground fuel storage tanks, outside storage of hazardous material, dumpsters and refuse containers, any part of a sanitary waste disposal system are not permitted, nor is the disturbance of any existing vegetation within the first 50 feet of the buffer zone to the wetlands.

Other Regulations**Scenic Roads**

The Town of Boxborough has designated a number of roads as "scenic roads" under MGL Ch 40, Sec. 15C. These provisions require that Planning Board hold a public hearing to review and approve any work that will result in the removal of stone walls and/or trees within the public right of way of streets. This hearing is often held simultaneously with the Public Shade Tree hearing.

Public Shade Tree Act

The Public Shade Tree Act is a state regulation that requires that a Planning Board and the town Tree Warden hold a public hearing prior to the removal of a tree within the public right of way.

RELATIONSHIP BETWEEN EXISTING REGULATIONS AND COMMUNITY DESIRES

The following summary illustrates issues that the current bylaws do not address, general areas of concern and possible responses related to zoning or other regulatory controls. It calls attention to issues raised by the public and suggests areas that the local bylaws and regulations may not be responding to community desires. The list was derived from comments made at committee meetings and public workshops during the master planning process.

Residential Development

Maintain Conventional Subdivision Standards, but provide other alternatives as well.

- ❑ Affordable Housing - Inclusionary Housing Bylaw and/or density bonus for affordable housing as an alternative to open space design
- ❑ Back Lot Development – Route 111, incentives for use of common drives – Adopted at STM Nov, 2001
- ❑ Open Space Residential Design Bylaw – subdivision alternative, more open space
- ❑ Rural Subdivision Alternative– subdivision alternative, incentives for lower density
- ❑ Accessory Apartments – for immediate family, affordable housing, enforcement issues
- ❑ Rate of Development – Phasing, Annual Building Permit Cap

Community Character & History

- ❑ Historic District – MGL c. 40C
- ❑ Demolition Delay Bylaw – providing an opportunity for preservation of historic structures
- ❑ Scenic Road Bylaw – MGL c. 40 §15C, Shade Trees MGL c. 87, could include additional “design” criteria where alteration will take place
- ❑ Design Guidelines in Business zones; Design Review for all non-residential development

Preservation

- ❑ Prioritization of Open Space for Acquisition – develop methodology.
- ❑ TDR– Transfer of Development Rights from sensitive areas to less sensitive areas

- ❑ Process for Purchase of Development Rights – APR, conservation restrictions, etc.

Zoning – dimensions, uses

- ❑ Public Gathering Places - Provide for meeting places, especially in TC
- ❑ Scale of Retail – Maintain modest size limits for non-residential retail etc. – local not regional focus
- ❑ Mansionization – size of new homes in general and development on small lots, altering community character and making housing less affordable.
- ❑ Cul-de-sacs: Continue to evaluate the “cost-benefit” of the 500-foot maximum cul-de-sac length, acknowledging the trade-offs between aesthetics, safety and sense of neighborhood provided by dead ends and the potential to avoid greater numbers of curb cuts, difficulty with Emergency access, plowing, and general circulation associated with cul-de-sacs.
- Fiscal Impacts – add a fiscal evaluation element to the Impact Evaluation required for development.

RECOMMENDATIONS FOR CHANGE

As noted in earlier chapters, the master planning process involved a significant public participation effort. Through the collection of data related to existing conditions, interviews, committee meetings, and public workshops, the needs and desires of Boxborough residents were identified. The remainder of this chapter will focus on specific recommendations based on the ideas and critique generated as a part of the master planning process, as related specifically to regulatory controls. The Action Plan comprises a set of recommended strategies that include non-regulatory controls to implement the desired future for the town. Appendix 10-1A and 10-1B contain draft language for regulatory controls, including zoning and other by-laws and regulations that the Steering Committee, Planning Staff and consultants identified as highest priority.

Overwhelmingly, the strongest desire of the Boxborough community is to preserve community character. This goal is associated with several related concepts: preservation of open space, protection of natural resources (especially water quality), maintaining the vista along scenic roads and from scenic places, and maintaining or increasing the ability to afford to live in Boxborough. While prior attempts to pass a “cluster development” bylaw have been met with opposition, a well-drafted Open Space Residential Design bylaw could respond to a number of these goals.

Since Boxborough appreciates its larger lot sizes, it is recommended that lot sizes within an Open Space Residential Design be reduced modestly, to 40,000 square feet. The actual number of units would not change, therefore density would not increase - the remaining land would be preserved as open space. Since the town desires to limit future build out, a density bonus need not be provided. Additionally, the open space bylaw should include open space of 30% minimum, including a stated upland requirement to

avoid preservation only of unbuildable areas. An open space residential design (OSD) bylaw was drafted by the master plan consultant attorney to respond to the stated goals (see Appendix 10-1A). The Planning Board should review this draft, seek public comment, make appropriate revisions and facilitate subsequent approval by Town Meeting.

Related to the goals of community character, open land preservation and limited buildout, the Town should also consider approving a Rural Subdivision alternative to the conventional subdivision scheme. As with any incentive, trade-offs will be required. The rural subdivision concept is to allow, by right, buildout of a parcel with fewer lots than might be allowed under a conventional plan. In exchange, the Planning Board would have the authority to waive certain subdivision standards. Most important are those standards that are both expensive and often detract from a rural scale development. By granting waivers for the width of roadways, sidewalk requirements, and engineering drainage systems in exchange for open country drainage, trails, and smaller roads that dictate slower travel speeds, Boxborough could provide incentives for a win-win development program. Guidelines would be required to suggest a modified set of subdivision standards related to these criteria, and to assist the Board in applying uniform standards to each applicant. Obviously, the specific reduced standards and site design review would be done on a case-by-case basis. The result of this option would be to reduce density, lower ultimate community buildout and provide property owners with an alternative to the conventional subdivision standards by providing a lower density more rural scale development pattern.

The Commonwealth imposes a standard that every community provides 10% of its housing stock in affordable housing, as defined by state criteria. While Boxborough prides itself in retaining relatively affordable home prices, the median home sale price has risen dramatically in recent years, new homes are generally much larger than exhibited historically, and many people who grew up in town or who now work for the town cannot afford to live in Boxborough. Since every new market rate development effectively waters down the existing affordable stock, an Inclusionary Housing bylaw and/or a variation of the Open Space Residential Design (in which the open space would be sacrificed for the provision of affordable housing) is recommended to help improve this situation.

Recently, Boxborough adopted an Affordable Housing Plan and created a Housing Board. The plan spells out a pro-active approach to increasing the supply of affordable housing to accommodate local need. An inclusionary housing bylaw could be consistent with the charge of the Plan by providing privately developed affordable housing units that would count toward the state's requirement. A draft bylaw has been provided to the Planning Board and Housing Board for review (see Appendix 10-1B). While subject to review and modification by these Boards and the general public, the draft sets forth a flexible requirement to avoid an undue burden on the small-scale developer. In its simplest terms, it is recommended that every development of over six lots would be required to contribute a proportionate share of affordable housing. The requirement could be met by any combination of on or off-site housing units (or land), including

restricting rents in existing rental units, deed-restricting condominiums, constructing new units on or off-site, or donating land that could be developed by the town for affordable housing.

Other recommendations are somewhat smaller in scale, but not necessarily less important. All of the items listed in the headings above should be discussed and considered in greater detail. The Planning Board is already discussing the possibility of back lot development along Route 111. Additionally, there has been discussion of a modification to or greater incentive for the use of common driveways that might limit curb cuts and also preserve road frontage, especially along scenic roads.

Since open space preservation is such a priority, a process for identifying and then prioritizing land for either outright purchase by the Town or alternatively seeking acquisition of development restrictions will be helpful. A model worksheet has been developed by the master plan consultant to assist in this regard (see Attachment 10-1C). The worksheet allows the community to insert its priorities for open space (e.g. recreation, flood control, conservation, habitat) and to evaluate each individual parcel for its ability to satisfy these goals. A weighted rating allows the user to prioritize the parcels for future acquisition. The use of this worksheet, combined with common sense should be helpful to those charged with the task of open space preservation.

The other topic areas mentioned in the list above also deserve attention and town staff could accomplish a number of these goals with minor amendments to the bylaws or regulations. For example,

- Design Guidelines and Design review should apply to all non-residential development;
- A demolition delay bylaw could help to preserve historic structures by demolition avoidance or building relocation
- Finally, a formal review of the location of zoning districts should be accomplished to ensure that the future buildout of undeveloped land (or redevelopment of existing developed land) is consistent with community goals. Already, there has been discussion of the business district in the vicinity of Summer Street as well as Route 111 and the Industrial/Commercial District along the easterly side of I-495 near the Littleton line.

Boxborough should continue to take a proactive approach to review and update of all of the town's regulatory controls; an annual review will assist in keeping regulations in check with the community's vision and goals.

CHAPTER 11

ACTING ON THE VISION

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ACTING ON THE VISION

INTRODUCTION

Boxborough has a history of thoughtful planning. Although the town has not had a master plan, town government has been able to manage the scale and pace of development. With the proposed development of the Cisco Systems campus, the town decided to comprehensively assess its resources and services and what recent growth means for the future of the town. The people of Boxborough have stated that they value the small-town, family-oriented, rural atmosphere, high-quality schools, safe neighborhoods, historical places and scenic qualities; they want to keep these key features that attracted them to the town. They have seen the recent rapid pace of development in the I-495 corridor that they fear will result in a loss of open land and increased demand for town services and facilities in Boxborough that could change the character of the town. Through a series of community workshops and steering committee meetings, goals, objectives and actions have been developed that will guide Boxborough in the future.

While the town has focused on its physical attributes and resources, it has been mindful that it is located in the midst of the fastest growing area of the state and that without a regional context a town master plan will not succeed. Although State Executive Order 418 encourages communities to develop Community Development Plans, that was not the driving force behind this master plan, since the state program began after the master plan started. This plan has tried to conform to the State EO 418 guidelines that acknowledge regional needs and infrastructure.

Many of the action items that follow involve regulations. Boxborough has many strong regulations in place that balance protection of land with the rights of property owners. What are suggested in this document are ways to enhance and strengthen those regulations and to encourage the kind of development that Boxborough desires.

GOALS, OBJECTIVES, AND ACTIONS

The Action Plan, serving as a summary of the Goals, Objectives and Actions Items, forms the framework within which the town should base its future decisions. The basis for the following

list of goals, objectives and actions is detailed in the previous chapters of this plan. The matrix that follows this list is the implementation strategy that assigns responsibility and a schedule for implementing the recommended actions. Some of the goals, objectives and actions may conflict with each other. For example, a road widening to enhance public circulation and safety might conflict with the desire to maintain the character of rural roadways, or a commercial development that would otherwise have little impact on town infrastructure, public services and traffic might be proposed on a piece of cherished open space. The master plan document provides several tools to help decision makers. Using the Resource Sensitivity Analysis or a similar ranking model, a town board can weight the criteria to meet community needs at a given time. The community impact analysis can also be used to find solutions to land use and fiscal problems. These tools and the data provided in the master plan will assist town boards and officials to make sound objective choices that will benefit the town now and in the future.

Land Use:

Goal

Anticipate pressure to develop by managing growth.

Objective

Assure that development does not exceed the capacity of infrastructure systems and public services and facilities.

Action items:

- Update environmental impact report requirements for both commercial and residential developments over a certain size to include fiscal impacts (costs/benefits) and community impacts such as the impact on general government and schools.
- Propose to amend Subdivision Rules to allow phasing large residential subdivisions if phasing encourages development that can be better accommodated by town services and facilities.
- Investigate and assess the potential impact on development of adopting a transfer development rights bylaw to preserve open land and to encourage development on land that has greater carrying capacity.
- Revise Wireless Communication Bylaw based on recent legal rulings.

Goal

Preserve the elements of Boxborough that contribute to the town's rural residential character with strong agricultural and historical roots.

Objective

New growth should be consistent with the town character by maintaining its rural and historical elements.

Action items:

- Propose to amend the town's Scenic Road Bylaw to include such as criteria for removal/maintenance of stonewalls and tree clearing, in accordance with Scenic Road

and Shade Tree statutes (MGL c. 40 §15C and MGL c. 87) and/or other tools such as requirements for tree replacement or other mitigation. Develop design standards for replacements and alterations.

- Preserve features of the natural and constructed environment that contribute to town character such as open fields, scenic roads and vistas, stonewalls, tree canopies, and woodlands.
- Propose a zoning bylaw and amendments to the subdivision regulations to encourage preservation of desired characteristics, such as open space residential design (OSRD) developments, in exchange for smaller lot sizes (40,000 square foot minimum lot size) combined with open space preservation (same density as conventional subdivision), or rural subdivisions that would allow fewer lots (lower density) in exchange for reduced development standards for roadway and drainage design. The "alternate criteria" for such subdivision variations would be included within the Subdivision Rules; for example, the road standards that would apply to a rural subdivision and the design criteria for an OSRD.
- See Natural and Cultural Resources for goals on protection of agricultural and historical resources.

Objective

Encourage the defined development of the Town Center to promote a sense of community and to encourage business development where it can best be accommodated.

Action items:

- Continue to limit the size of businesses to discourage regionally oriented businesses and encourage locally oriented ones.
- Encourage a compatible mixture of residential with commercial uses that provide needed goods and services and a customer base by allowing the preferred uses by right.
- Review required mix of commercial and residential uses in the Town Center District.
- Consider expanding the uses in the Town Center District to encourage social gatherings.

Goal

Balance economic development with community character.

Objective

Encourage economic development along Routes 111, the area west of I-495.

Action items:

- Continue to keep commercial development small, consistent with the town character and with the carrying capacity of Route 111 by limiting the size of commercial development to 25,000 square feet.
- Propose to rezone non-residential land that is unlikely to be developed for business use to Agricultural/Residential.
 - IC parcel in northwest portion of the town
 - Summer Road parcel (Adopted at STM November 5, 2001)

- The master plan is intended to be broad-based. A parcel by parcel review of commercial properties should follow to evaluate the need for additional rezonings.
- Develop design guidelines for commercial development.
- Expand the Design Review process to the Business districts
- Review land uses allowed by right and by special permit in the Business, Industrial/Commercial and Office Park Districts.

Goal

Protect open land and encourage residential development where it is most appropriate.

Objective

Use the natural features of the land as a guide to where residential development should occur.

Action items:

- Use the resource sensitivity analysis or similar model such as the Conservation Commission Ranking Model for land development and land acquisition decision-making.
- Rank all undeveloped parcels of land over 10 acres in size for their conservation/open space value.
- Adopt an open space residential design bylaw with complementary subdivision regulations and appropriate design guidelines. (A draft is included in the Appendix.)
- Continue to use the Land Use Group (LUG) to review town land use needs.

Objective

Consider forms of housing that are consistent with town character.

Action items:

- Propose to amend the Zoning Bylaw to allow residential development on smaller lots (40,000 square foot minimum) with associated open space preservation and attached residential (side by side townhouses) development in the Town Center.
- Limit loss of community character by residential structures that "overpower" their lots by adopting building lot coverage and minimum open space regulations that keep the scale of development units in relation to the supporting land area.
- See goals for affordable housing below.

Housing:

Goal

Ensure that Boxborough remains an affordable and enjoyable place to live by encouraging the creation of housing that is available to people of all income and age levels.

Objectives

Maintain the diversity of housing types that will result in the maintenance of a diverse population.

Encourage the creation of housing for selected housing groups: young adult resident first time homebuyers, town teachers and employees, seniors 60+ years of age.

Avoid threat of Comprehensive Permits in which the Town has little control.

Support the Boxborough Housing Board in carrying out implementation of the Long Range Affordable Housing Plan.

Action items:

- Proactively work with housing developers to create diverse and affordable housing opportunities.
- Propose to amend the Zoning Bylaw to allow the construction of affordable housing through density bonuses, where the land can support such development, because the affordable units provide a special town benefit.
- Balance the desire to create developments that are consistent with town character with the need to provide affordable housing.
- Assess the effectiveness of adopting an Inclusionary Housing Bylaw on meeting affordable housing needs.

Objective

Consider alternative forms of housing to broaden the housing stock.

Action Items:

- Proposed an Accessory Apartment Bylaw that addresses issues and concerns raised at previous Town Meetings regarding size of unit and the relationship of the owners and the renters.

Objective

Implement Long Range Affordable Housing Plan

Action Items:

- Acquire land specifically for affordable housing.
- Develop a priority list of parcels suitable for acquisition for affordable housing.
- Educate the public about the importance of acquiring these parcels and the need for affordable housing.
- Use a portion of an existing municipal parcel of land for affordable housing development.

Goal

Create incentives to develop housing choices

Objective**Streamline permit approval process*****Action Items:***

- Work with developers early in the process to negotiate an acceptable proposal.
- Coordinate town review of proposals to streamline approval process.
- Consider having boards hold joint public hearings.
- Streamline site plan approval for builders who create affordable housing within their developments or cooperate with the town in ways that satisfy the town's affordable housing production goals.

Objective**The Town develops its own affordable housing using town-owned or town acquired land.*****Action Items:***

- Review existing town-owned land for potential development of affordable housing.
- Develop a priority list for potential acquisition; educate the public about why these parcels are important.
- Develop site plans for Open Space Affordable Housing on town-owned land.
- Town acquires land to reduce cost of development and to control the design and density of the affordable housing development.

Goal

<p>Encourage the development of housing that is consistent with the town character.</p>
--

Objective**Protect open space and other natural and cultural resources.*****Action items:***

- Adopt a Demolition Delay Bylaw to preserve historical (more than 50 years old) structures and the existing housing stock.
- Create one or more local historic districts based on the Historic Inventory.
- Propose an Open Space Residential Design Bylaw to encourage the preservation of open space by clustering of housing units. (A draft is included in the Appendix.)
- Limit the size of single-family units by right; allow larger units by special permit.
- Expand the types of developments reviewed by the Design Review Committee.

Economic Development:**Goal**

<p>Balance the tax base between residential and non-residential development so that the tax burden can be shared.</p>
--

Objective

Avoid overburdening the residential taxpayers base.

Action items:

- Monitor the tax base balance.
- Review the fiscal impacts of adopting a split tax rate.
- Consider phasing large residential subdivisions if phasing encourages development that can be better accommodated by town services and facilities.
- Strive to maintain a minimum of 70% residential to 30% commercial tax base ratio.
- Monitor enrollments, especially at the elementary school, to determine if additional space will be required.

Objective

Support the Economic Development Committee and the Boxborough Business Association in their efforts to encourage small business development.

Action Items:

- Integrate the work of the Economic Development Committee into town planning efforts.
- The EDC should develop a focused program to promote business development and to provide business counseling and planning.
- Explore other organizational mechanisms that may be appropriate for Boxborough such as an Economic Development and Industrial Commission, to encourage economic development.

Goal

Ensure that future development is consistent with the town's character and does not impair the Town's infrastructure or natural resources.

Objective

Focus on the protection of the developable portions of Route 111.

Action items:

- Promote design guidelines for developments along Route 111 to protect trees and setbacks.
- Encourage common drives and/or access road and/or parking.
- Continue to discourage large-scale retail developments by size limits on certain uses.
- Review the use schedule of the Zoning Bylaw to determine if it is consistent with community goals.

Objective

Develop a Town Center developed in typical New England fashion, with pedestrian access, a green space and retail that remains open into the evening.

Action items:

- Continue to utilize the Design Review Board to ensure that development in Town Center is consistent with the town's character.
- Encourage retail that serves local needs, for example a small market or pharmacy.
- Encourage businesses owned by Boxborough residents through efforts of the Boxborough Business Association and the Economic Development Committee.

Objective

Protect natural resources while encouraging limited development

Action items:

- Preserve open space in Boxborough by adopting regulations that allow some development in exchange for protected open space.
- Protect water and water quality by using growth management tools like the resource sensitivity analysis to guide development away from these water resource sensitive areas.
- Encourage certain types of larger development to be developed under the OSCD Bylaw to protect significant resources while providing increased revenue. The Cisco development is a good example.

Natural and Cultural Resources:

Goal

Preserve Boxborough's heritage and rural character.
--

Objective

Protect Boxborough's scenic resources

Action items:

- Proposed to strengthen the town's Scenic Road Bylaw to implement design review and buffer strips along Boxborough's scenic roadways.
- Encourage landowners to preserve the natural resources on their own land through public education.

Objective

Protect Boxborough's agricultural resources.

Action items:

- Establish a policy for agricultural preservation.
- Add funds annually to the Conservation Trust for the purchase of agricultural land and/or the purchase of development rights.
- Educate agricultural landowners about the tax advantages of agricultural land preservation restrictions and Chapter 61A.
- Identify candidates for the Agricultural Preservation Restriction Program
- Encourage eligible landowners to enter into the Chapter 61

Objective**Provide incentives for renovation of the town's historical buildings*****Action items:***

- Inventory historical resources in accordance with Massachusetts Historical Commission criteria.
- Designate eligible areas as local historic districts. Establish a local historic district under MGL c. 40C around the area of highest concentration of historical buildings.
- Create design guidelines for development including the retention and stonewalls within a certain distance of main roads.
- Prioritize existing historical buildings and areas and look into obtaining state status for protection.
- Establish a demolition by-law in order to review and delay demolition of historical structures.

Goal**Protect the natural landscape and resources.****Objective****Protect the town's water supply.*****Action items:***

- Educate the community on the use of detergents, fertilizers, and other potentially harmful practices.
- Encourage the use of environmentally friendly products.
- Track water usage and the town's carrying capacity to determine future water needs.
- Continue groundwater monitoring program along with Site Plan Approval.
- Minimize the use of road salt.
- Identify vacant lands within the water supply protection areas for acquisition.
- Maintain inter-town communication to protect sources of public water supplies that cross town borders.
- Map existing private wells and septic systems on GIS.
- Track water quality problems (21E and UGSTs) on GIS.
- Also see Public Services and Facilities.

Objective**Ensure that development complements the town's natural resources; "green planning."*****Action items:***

- Review the costs/benefits of adopting a cluster development bylaw. Propose such a bylaw at a future Town Meeting.
 - Model it after another town that has the type of developments Boxborough would like to encourage.
 - Consider provisions specifying "quality" of land.

- Consider a provision ensuring that the town is given some form of rights to the open parcel.
- Encourage preservation of open space beyond minimum requirements during the Special Permit, Site Plan Approval and Subdivision review processes.

Objective

Protect natural resources and open spaces

Action items:

- Use the resource sensitivity analysis, Conservation Commission ranking, or a similar model to prioritize Chapter 61 and other open land parcels for acquisition.
- Investigate ways to purchase development rights.
- Promote the use of town-owned lands for environmental education.
- Inventory wildlife habitats of rare and endangered species and develop a plan to protect them.
- Develop new and updated regulatory tools to protect resources.
- Update wetland zoning maps on GIS.
- Adopt a stewardship program for conservation lands.
- Update wetland buffer zone criteria.

Open Space and Recreation:

Goal

Acquire additional land for conservation and recreation.

Objective

Develop a land acquisition strategy that helps prioritize potential parcels.

Action items:

- Maintain a list of Chapter 61, 61A, and 61B lands that tracks their renewal date for possible acquisition opportunity.

Objective

Take advantage of all funding resources for land acquisition.

Action items:

- Educate the public on the value of open land and the tax advantages of Chapter 61 designation, Conservation Restrictions and Agricultural Preservation Restrictions.
- Apply for Self-Help funds for open space acquisition.

Goal

Protect Boxborough's open spaces.
--

Objective**Establish a management and maintenance plan for existing conservation lands.****Action items:**

- Educate the community about the importance of keeping the trails clean.
- Hold community clean-up days.
- Adopt a stewardship program to encourage community groups or local businesses to “adopt” a conservation parcel.
- Update regulations to keep pace with changing State laws and regulations.

Objective**Encourage developers to create open spaces within new developments****Action items:**

- Propose an open space residential design bylaw within the Zoning Bylaw that encourages private creation of open spaces within new developments, similar to the existing Open Space Commercial Development.
- Propose to amend Subdivision Rule and Regulations to complement zoning provisions of the open space residential bylaw.
- Propose to amend Subdivision Rules and Regulations to complement the Open Space Commercial Development Bylaw.

Goal**Enhance public access and connectivity between existing conservation lands.****Objective****Coordinate with adjacent communities to provide regional connectivity and greenways.****Objective****Educate the public about existing conservation lands.****Action items:**

- Update the Conservation Land and Trail Guide and publicize it.
- Participate in regional open space planning efforts.

Goal**Improve and increase quality recreational opportunities to meet current and future demands.****Objective****Provide recreational opportunities that balance active and passive, formal and informal activities for all ages.****Action items:**

- Expand recreation programs to keep pace with increased population.

- Publicize recreation programs and opportunities.
- Periodically survey townspeople to gauge community needs.
- Have periodic meetings with conservation and planning officials in neighboring towns to identify regional recreation opportunities, linkages of open space, and greenways corridors.

Public Services and Facilities:

Goal

Meet the service and infrastructure needs of a growing population.

Objective

Continue to maintain a high level of town services.

Action Items:

- Support the School Population Projection Committee in its development of alternatives for the elementary school expansion.
- Support the Library Trustees in their plans to construct a new library building.
- Support development of a town common on the land in the Town Center District.
- Periodically update the cost of community services worksheets.

Objective

Provide adequate space for operation of town services.

Action Items:

- Study operational and storage space needs.
- Create a re-use plan for the current library building.
- Explore options for DPW highway barn expansion.
- Support a study of Town Hall space needs.

Goal

Adopt environmentally sound town policies.

Objective

Promote environmentally sound solid waste and wastewater management.

Action items:

- Educate the community on function and proper maintenance of their wells and septic systems.
- Track failed septic systems.
- Sponsor regular hazardous materials drop off days.
- Promote the use of town-owned lands for environmental education.

Goal**Protect the water supply.****Objective****Provide an adequate water supply that is of high quality.***Action Items:*

- Make no decisions about the water supply until the ongoing water study has been completed.
- Limit the use of road salt.
- Educate the community on the use of detergents, fertilizers and other potentially harmful chemicals.
- Continue groundwater monitoring program with Site Plan Review process.
- Identify vacant land within water supply protection areas for acquisition.
- Also see Natural and Cultural Resources.

Objective**Restore polluted natural resources.***Action items:*

- Identify vacant land within water supply protection areas for acquisition.
- Institute and enforce penalty fees for failing septic systems and other environmentally harmful violations.
- Encourage volunteer groups or the community to have “clean-up” days.
- Monitor 21E sites and their clean-up.

Circulation:**Goal****Provide a safe and convenient circulation system that includes roads, bike paths, sidewalks, and trails.****Objective****Provide safe areas for recreational activities as well as alternative modes of transportation.***Action Items:*

- Plan residential and commercial developments to include trails and walkways, when possible.
- Work with adjacent communities to develop plans to provide connections from Boxborough to regional trails within these communities.
- Create an outreach program to publicize trail systems.

Objective

Closely monitor local intersections as developments progress to identify and resolve traffic delays and safety deficiencies.

Action Items:

- Continue to require traffic studies for developments that result in more than 50 vehicle trips during the peak hour and more than 250 daily trips.
- Monitor traffic along Route 111 at key intersections.
- Monitor large scale commercial traffic to determine if post occupancy traffic patterns are consistent with pre-development traffic analysis.

Objective

Assess the need for sidewalks/pathways as commercial and residential developments are reviewed, particularly near the Town Center.

Action Items:

- Ensure that sidewalks/pathways are planned for and installed at needed locations to provide for pedestrian safety.
- Develop a pathway plan along Route 111.
- Develop a sidewalk design that is sensitive to Boxborough's rural residential character.

Goal

Improve operations and safety at Blanchard Memorial School driveways.

Objective

Increase the parking capacity at the school and/or at the Boxborough Fire Station and encourage more efficient usage of available parking.

Action Items:

- Improve signage on the u-shaped driveway at the school's main entrance to encourage use of all available spaces during pick-up/drop-off periods.
- Initially provide police or school personnel to direct parents to use all available spaces until existing patterns are modified.
- Increase parking on the school's property or provide parking at the Fire Station.

Goal

Protect the safety, convenience, and welfare of the inhabitants of Boxborough by regulating the laying out and constructing of ways in subdivisions.

Objective

Provide a local roadway network that can safely accommodate the demands of vehicular and pedestrian traffic, and allow for town services and emergency response to be carried out quickly and effectively.

Action Items:

- Continue to require new roadways to meet design standards that allow for safe travel and full access of emergency vehicles.
- Require sidewalks/pathways, where appropriate, along major roadways.
- Evaluate the construction of cul-de-sacs in light of the need to promote efficient town services.

Goal

Develop residential property to provide through roadways to improve traffic flow and ease of town services.

Objective

Continue to require developments to provide roadway improvements to mitigate traffic impacts and avoid diversion of traffic to local residential roadways.

Action items:

- Provide a local road network that coordinates subdivision roads with existing roadway and future roadways.
- Carefully review subdivision plans to consider future roadways connections and to minimize access points on main roads.

Objective

Mitigate all impacts of future developments to maintain existing roadway operations.

Action items:

- Require that development projects and their associated mitigation should provide acceptable operating conditions as defined by the State, and offset project impacts as completely as possible.
- Require developers to fund project reviews by independent consultants when staff is not available.
- Develop a town-wide traffic model to monitor the impacts of development created within the town and as part of regional growth.

Goal

Encourage the use of alternative forms of transportation.

Objective

Reduce the impact of non-residential development

Action items:

- Require Transportation Demand Management plans as part of the special permit and site plan approval processes for Industrial/Commercial uses.
- Encourage the use of private shuttle buses to transportation nodes.
- Encourage employees to use bicycles and motorcycles.

Objective

Encourage residents to use alternatives to vehicles.

Actions Items:

- Provide safe pathways for pedestrians and bicyclists along Route 111.
- Encourage the use and expansion of trail systems through the town.
- Create bicycle lanes on Route 111 and identify other routes suitable for accommodating through bicycle traffic.

IMPLEMENTATION RESPONSIBILITIES

The following section assigns responsibilities for implementation to various town boards and staff. Abbreviations are used for simplification.

Abbreviations used in the “Parties Responsible for Implementation” column of the Action Plan

BHB	Boxborough Housing Board	IT	Information Technology
BOH	Board of Health	L	Library Trustees
BOS	Board of Selectmen	LUG	Land Use Group
CC	Conservation Commission	PB	Planning Board
DPW	Department of Public Works	POL	Police
DRB	Design Review Board	Rec	Recreation Commission
EDC	Economic Development Commission	SC	School Committee
FINCOM	Finance Committee	TA	Town Administrator
HC	Historical Commission	TM	Town Meeting

The timeframe for action is indicated as follows:

- 1 = Immediately – 2 years
 2 = 2-5 years
 3 = more than 5 years

Land Use Action Plan	Party Responsible	Time Frame
Assure that development does not exceed the capacity of infrastructure systems and public services and facilities.		
<ul style="list-style-type: none"> Update environmental impact report requirements for both commercial and residential developments over a certain size to include fiscal impacts (costs/benefits) and community impacts such as general government and schools. 	PB	1
<ul style="list-style-type: none"> Propose to amend Subdivision Rules to allow phasing large residential subdivisions, if phasing encourages development that can be better accommodated by town services and facilities. 	PB	2
<ul style="list-style-type: none"> Investigate and assess the potential impact on development of adopting a transferable development rights bylaw to preserve open land and to encourage development on land that has greater carrying capacity. 	PB	3
<ul style="list-style-type: none"> Revise Wireless Communications Bylaw based on recent legal rulings. 	PB	1
New growth should be consistent with the town character by maintaining its rural and historical elements.		
<ul style="list-style-type: none"> Propose to amend the town's Scenic Road Bylaw to include such as criteria for removal/maintenance of stonewalls and tree clearing, in accordance with Scenic Road and Shade Tree statutes (MGL c. 40 §15C and MGL c. 87) and/or other tools such as tree replacement or other mitigation. Develop design standards for replacements and alterations. 	BOS, PB	1
<ul style="list-style-type: none"> Preserve natural and built features that contribute to town character such as open fields, scenic roads and vistas, stonewalls, tree canopies, and woodlands. Adopt new zoning and subdivision regulations for Open Space Residential Design and Rural Subdivision. 	PB	1
<ul style="list-style-type: none"> 	PB	1
Encourage the defined development of the Town Center to promote a sense of community and to encourage business development where it can best be accommodated.		
<ul style="list-style-type: none"> Continue to limit the size of businesses to discourage regionally oriented businesses and to encourage locally oriented ones. 	PB	Ongoing

Land Use Action Plan - Continued	Party Responsible	Time Frame
<ul style="list-style-type: none"> Encourage a compatible mixture of residential and commercial uses that provides needed goods and services and a customer base by allowing more uses by right. 	PB	1
Establish a policy for agricultural preservation – See Natural and Cultural Resource		
Encourage economic development only along Route 111 and the area west of I-495		
<ul style="list-style-type: none"> Encourage business development away from single-family residential neighborhoods. Consider rezoning undeveloped Business Industrial/Commercial zoned land near single residential developments and not fronting on Route 111 to Agricultural/Residential. 	PB, TM	1
<ul style="list-style-type: none"> Continue to keep commercial development small, consistent with the town character and with the carrying capacity of Route 111 by limiting the size of commercial development to 25,000 sf. 	PB, EDC	1
<ul style="list-style-type: none"> Propose to rezone non-residential land that is unlikely to be developed for business use to Agricultural/Residential. <ul style="list-style-type: none"> IC parcel in northwest portion of the town Summer Road parcel (Adopted at STM November 5, 2001) 	PB, TM	2
<ul style="list-style-type: none"> Develop design guidelines for commercial development. 	PB, EDC, DRB	2
<ul style="list-style-type: none"> Expand the Design Review process to the Business districts. 	PB, TM, EDC, DRB	1
<ul style="list-style-type: none"> The Town Center District zoning permits retail less than 25,000 sf., services shops, craft shops, and offices by right. The Town should review the use regulations in this district. Consider expanding the uses in the Town Center District to encourage social gatherings. 	PB, EDC	2
<ul style="list-style-type: none"> Adopt new setback requirements and design standards for developments along Rt. 111 	PB, DRB	2
Use the natural features of the land as a guide to where residential development should occur.		
<ul style="list-style-type: none"> Use the resources sensitivity analysis, Conservation Commission ranking, or similar model for land development and land acquisition decision-making. 	PB, BOS, CC	1
<ul style="list-style-type: none"> Keep higher density developments near high traffic areas (Route 111, 2, I-495). 	PB	Ongoing
Land Use Action Plan - Continued	Party	Time Frame

	Responsible	
▪ Identify and rezone selected parcels zoned Business or Commercial Industrial that are not suitable for commercial purposed to residential districts.	PB	1
▪ Continue to use the Land Use Group (LUG) to review town land use needs.	LUG	Ongoing
Consider alternative forms of housing that are consistent with town character and will result in a diverse town population.		
▪ Propose to amend the Zoning Bylaw to allow residential development on smaller lots (40,000 sf. minimum) with associated open space preservation and attached residential (side by side townhouses, not two-family with one unit over another) development in the Town Center.		1
• Locate clustered and attached residential development in the Town Center District.	PB, TM	2
▪ Limit loss of community character by residential structures that "overpower" their lots by adopting building lot coverage and minimum open space regulations that keep the scale of development units in relation to the supporting land area.	PB, TM	1
▪ Advise the town on financial implications of land use changes.	FINCOM	Ongoing
▪ Propose to expand the types of developments reviewed by the Design Review Committee	DRC	1

Housing Action Plan	Party Responsible	Time Frame
Increase the diversity of housing types to maintain a diverse population.		
Encourage the creation of housing for selected housing groups: young adult resident first time homebuyers, town teachers and employees, seniors 60+ years of age.		
Avoid threat of Comprehensive Permits in which the town has little control.		
Support the Boxborough Housing Board in carrying out implementation of the Range Affordable Housing Plan.		
<ul style="list-style-type: none"> Proactively work with housing developers to create diverse and affordable housing opportunities 	PB, BHB	Ongoing
<ul style="list-style-type: none"> Propose to amend the Zoning Bylaw to allow construction of affordable housing through density bonuses, where the land can support such development, because the affordable units provide special town benefit. 	PB, BHB	2
<ul style="list-style-type: none"> Balance the desire to create developments that are consistent with town character with the need to provide affordable housing. 		
<ul style="list-style-type: none"> Assess the effectiveness of adopting an inclusionary housing bylaw. 	PB, BHB	1
Implement the Long Range Affordable Housing Plan.		
<ul style="list-style-type: none"> Acquire land for affordable housing. 	BOS, TM	Ongoing
<ul style="list-style-type: none"> Develop a priority list of suitable parcels. 	BHB, BOS	1
<ul style="list-style-type: none"> Educate the public about the importance of acquiring these selected parcels and the need for affordable housing. 	TA, PB, BOS, BHB	Ongoing
Streamline the approval process for affordable housing developments.		
<ul style="list-style-type: none"> Work with developers early in the process to negotiate an acceptable proposal. 	PB	Ongoing
<ul style="list-style-type: none"> Coordinate Town review of proposals. 	BOS, TA	1
<ul style="list-style-type: none"> Consider having boards hold joint public hearings. 	TA, PB, BOS	1, 2
<ul style="list-style-type: none"> Streamline site plan approval for builders who create affordable housing within their developments or cooperate with the town in ways to satisfy the town's affordable housing production goals. 	PB	1
Permit alternative forms of housing.		

Housing Action Plan - Continued	Party Responsible	Time Frame
<ul style="list-style-type: none"> Consider allowing small accessory apartments within existing housing units; deed restrict these units as affordable. 	PB, BHB	2
<ul style="list-style-type: none"> Consider clustered and attached housing in the Town Center District. 	PB, BHB	2
The town becomes the developer of affordable housing using town-owned land or acquired land to control design and costs. All units are affordable.		
<ul style="list-style-type: none"> Review existing town-owned land for development of affordable housing. Use a portion of an existing municipal parcel of land for affordable housing development 	BOS, BHB	1
<ul style="list-style-type: none"> Town acquires land to reduce the cost of development and to control the design and density of the affordable housing development. 	BHB	1, 2
<ul style="list-style-type: none"> Develop a priority list of parcels for potential acquisition; educate the public why these parcels are important. 	BHB	1
<ul style="list-style-type: none"> Develop site plans for Open Space Affordable Housing on town-owned land. 	BOS, BHB	1
Protect open space and other natural and cultural resources. See Natural Resources.		

Economic Development Action Plan	Party Responsible	Time Frame
Avoid overburdening the residential taxpayer base.		
• Monitor tax base balance.	BOS, FINCOM	Ongoing
• Review the fiscal impacts of adopting a split tax rate.	FINCOM	1
• Consider phasing large residential subdivisions if phasing encourages development that can better be accommodated by town services and facilities.	PB	2, 3
• Strive to maintain a minimum of 70% residential to 30% commercial tax base ratio.	BOS	1
• Monitor enrollments, especially at the elementary school, to determine if additional space will be required.	FINCOM, SCH	Ongoing
Support the Economic Development Committee and the Boxborough business Assoc in their effort to encourage small business development.		
• Integrate work of the Economic Development Committee into town planning efforts.	BOS	Ongoing
• The EDC should develop a focused program to promote business development and to provide business counseling and planning.	EDC	1
• Explore other organizational mechanisms that may be appropriate for Boxborough, such as an Economic Development and Industrial Commission.	EDC	2
Focus on protection of the developable portions of Route 111.		
• Promote design guidelines to protect physical features such as trees and stone walls that give character to the area.	BOS	1
• Encourage common driveways and/or access roads and/or parking for commercial developments.	PB	1
• Continue to discourage large-scale developments by size limits on certain uses.	PB	Ongoing
• Review use schedule of the Zoning Bylaw to determine if it is consistent with community goals.	PB	1
Develop the Town Center in typical New England fashion with pedestrian access, a green space, and retail that remain open into the evening.		
• Continue to utilize the Design Review Committee to ensure that development in the Town Center is consistent with the town's character.	PB, EDC, DRC	Ongoing

Economic Development Action Plan - Continued	Party Responsible	Time Frame
▪ Encourage retail businesses that serve local needs.	EDC	Ongoing
▪ Encourage businesses owned by Boxborough residents through efforts of the Boxborough Business Association and the Economic Development Committee.	EDC, BBA	Ongoing
Protect natural resources while encouraging limited development.		
▪ Encourage certain types of large development that will protect significant resources while providing increased revenue.	PB	Ongoing
▪ Preserve open space in Boxborough by adopting regulations that allow some development in exchange for protected open space. (See Chapters 7 and 10.)	PB, CC	1
• Protect water and water quality by using growth management tools like the resource sensitivity analysis to guide development away from these water resource sensitive areas.	PB, CC	Ongoing
• Encourage certain types of large development that will protect significant resources while providing increased tax base.	PB	Ongoing

Natural and Cultural Resources Action Plan	Party Responsible	Time Frame
Protect Boxborough's scenic resources.		
• Modify the Scenic Road Bylaw to include design criteria for modification of stone walls and the replacement of trees along Boxborough's designated scenic roadways.	PB	1
• Encourage landowners to preserve the natural resources on their own land by developing design guidelines and through public education.	PB	Ongoing
Protect Boxborough's agricultural resources.		
• Identify candidates for the Agricultural Preservation Restriction Program.	CC	1
• Educate the public about the tax benefits of Chapter 61, 61A and 61B.	BOS, PB, CC	Ongoing
▪ Allow appropriate town-owned land to be used for agriculture.	BOS	2
▪ Establish a process for the purchase of agricultural land and/or the purchase of transferable development rights.	BOS	1
▪ Educate eligible property owners about the tax advantages of agricultural land preservation restrictions. Encourage eligible landowners to enter into the Chapter program.	BOS, PB, CC	Ongoing
Provide incentives for renovation of the town's historical resources		
• Inventory historical resources in accordance with Mass. Historical Comm. Guidelines.	HC	1
• Establish a Demolition Delay Bylaw in order to review and delay demolition of historical structures.	BOS, HC	1
• Prioritize existing historical buildings and areas; investigate obtaining historical status. Establish a local historic district under MGL c. 40C around the area of highest concentration of historical buildings.	BOS, HC,	2
• Create design guidelines for development, including retention of stonewalls and trees within certain distances of main roads.	BOS, HC, PB	1
Protect the town's water supply. Also see Public Services and Facilities.		
• Educate the community on the use of detergents, fertilizers and other potentially harmful practices.	DPW	Ongoing
• Encourage the use of environmentally friendly products.	DPW	2, 3

Natural and Cultural Resources Action Plan - Continued	Party Responsible	Time Frame
• Track water usage and the town's carrying capacity to determine future water needs.	DPW	Ongoing
• Continue groundwater monitoring program along with Site Plan Approval	DPW, BOH	1
• Minimize use of road salt.	DPW, PB	1
• Identify vacant parcels within the water supply protection areas for acquisition.	DPW	Ongoing
▪ Maintain inter-town communication to protect sources of public water supplies that cross town borders.	BOS, DPW	1
▪ Track failed septic systems on GIS	BOH, IT	1
▪ Monitor septic pumping on GIS	DPW, IT	1
▪ Track well locations and pumping on GIS	DPW, IT	1
Ensure that development compliments the town's natural resources		
• Consider amending the zoning bylaw to allow open space residential developments that permit smaller lot sizes (40,000 sf.) and create protected, publicly-accessible open spaces.	PB, TM	1
• Encourage preservation of open space beyond minimum requirements	PB	2
Protect natural resources and open spaces		
• Use the resource sensitivity analysis or similar ranking to prioritize Chapter 61, 61A and 61 B parcels for acquisition.	BOS, CC	Ongoing
• Investigate ways to purchase development rights of open parcels.	BOS, CC	2
• Promote the use of town-owned lands for environmental education.	BOS, CC	Ongoing
▪ Inventory wildlife habitats of rare and endangered species and develop a plan to protect them	CC	2
▪ Update wetland zoning maps on GIS	PB, CC	1
▪ Update wetland buffer zone criteria	CC	1

Open Space and Recreation Action Plan	Party Responsible	Time Frame
Adopt a land acquisition strategy that prioritizes parcels for potential acquisition.		
• Maintain a list of Chapter 61, 61A and 61 B lands that tracks their renewal dates for possible acquisition.	BOS, PB, CC	1
• Create a fund for quick acquisition action when parcels become available.	BOS	2
Take advantage of all funding resources for land acquisition.		
• Educate the public on the value of open land and the tax advantages of Chapter 61, 61A, and 61B designation, conservation and Agricultural Preservation Restrictions.	BOS, CC	Ongoing
• Apply for Self-Help funds for open space acquisition.	CC	Ongoing
Establish a management and maintenance plan for existing conservation lands.		
• Educate the community about the importance of keeping the trails clean.	BOS, CC	Ongoing
• Hold community clean-up days.	BOS	Ongoing
• Encourage community groups and local businesses to "adopt" a conservation parcel for stewardship.	BOS	Ongoing
• Update regulations to keep pace with changing State laws and regulations.	CC	Ongoing
Encourage developers to create open spaces within their developments.		
• Establish an open space residential design bylaw within the Zoning Bylaw that encourages private creation of open spaces within new developments, similar to the existing Open Space Commercial Development.	PB, TM	1
• Propose to amend Subdivision Rules and Regulations to complement zoning provisions of the open space residential bylaw.	PB	1
• Propose to amend rules and Regulations to complement the Open Space Commercial Development Bylaw.		
Coordinate with adjacent communities to provide regional connectivity and greenways.		
• Hold periodic meetings with conservation and planning officials in neighboring towns to identify regional recreation opportunities, linkages to open space and greenway corridors.	CC	Ongoing

Open Space and Recreation Action Plan - Continued	Party Responsible	Time Frame
Educate the community about existing conservation lands.		
• Update the Conservation Land and Trail Guide and publicize it.	CC	1
• Participate in regional open space planning efforts.	CC	Ongoing
▪ Have periodic meeting with conservation and planning officials in neighboring towns to identify regional recreational opportunities, linkages of open space, and greenways corridors.	CC, PB	Ongoing
Provide recreational opportunities that balance active and passive, formal and informal activities for all ages.		
• Evenly distribute programs and facilities throughout the town.	Rec	Ongoing
• Publicize recreation programs and opportunities.	Rec	Ongoing
• Periodically survey townspeople to gauge community recreation needs.	Rec	Ongoing

Public Services and Facilities Action Plan	Party Responsible	Time Frame
Continue to maintain a high level of town services.		
▪ Support the School Population Projection Committee in its development of alternatives for elementary school expansion.	SC	1
▪ Support the Library Trustees in their land to construct a new library building.	L	1
▪ Support the development of a town common on land in the Town Center District.	BOS, PB	Ongoing
▪ Periodically update the cost of community services worksheets.	FINCOM	Ongoing
▪ The town should plan for future cemetery expansion.	BOS	3
▪ Educate the public regarding tax policy and financial impacts of public services and facility decisions.	FINCOM	Ongoing
Provide adequate space for operation of town services.		
▪ Study operational and storage space needs.	TA	2
▪ Create a re-use plan for the current library building.	TA, L	2
▪ Explore options for a DPW highway barn expansion.	DPW	2
▪ Support a Town Hall space needs study.	BOS	1
Promote environmentally sound solid waster and wastewater management.		
▪ Educate the community on the function and proper maintenance of wells and septic systems	DPW, BOS	Ongoing
▪ Track failed septic systems	DPW, BOH	Ongoing
▪ Sponsor hazardous materials drop-off days.	DPW	Ongoing
▪ Promote the use of town-owned lands for environmental education.	DPW, CC	Ongoing
Provide adequate water supply that is of high quality.		
▪ Make no decisions about the water supply until the ongoing water study has been completed.	BOS, DPW, TA	1
▪ Limit the use of road salt.	DPW	1
▪ Educate the community on the use of detergents, fertilizers and other potentially harmful chemicals.	BOS, DPW	Ongoing
▪ Continue groundwater monitoring program with Site Plan Review process.	DPW	Ongoing

Public Services and Facilities Action Plan - Continued	Party Responsible	Time Frame
Restore polluted natural resources		
▪ Identify vacant land within water supply protection areas for acquisition.	PB	1
▪ Institute and enforce penalty fees for failing septic systems and other environmentally harmful violations.	BOS, BOH	2
▪ Encourage volunteer groups or the community to have "clean-up" days.	BOS, BOH	Ongoing
▪ Monitor 21E sites and their clean up.	BOH	Ongoing

Traffic and Circulation Action Plan	Party Responsible	Time Frame
Provide a safe and convenient circulation system that includes roads, bike paths, sidewalks, and trails.		
▪ Plan residential and commercial developments to include trails and walkways, when possible.	PB, DPW	Ongoing
▪ Work with adjacent communities to develop plans to provide connections from Boxborough to regional trails within these communities.	PB, CC	Ongoing
• Create an outreach program to publicize existing trail systems.	CC	2
Closely monitor local intersections as developments progress to identify and resolve traffic delays and safety deficiencies.		
• Continue to require traffic studies for developments that result in more than 50 vehicle trips during the peak hour and more than 250 daily trips.	PB	Ongoing
• Monitor traffic along Route 111 at key intersections.	PB, DPW	Ongoing
• Monitor large-scale commercial traffic to determine if post-occupancy traffic patterns are consistent with pre-development traffic analysis.	PB	Ongoing
Assess the need for sidewalks/pathways as commercial and residential developments are reviewed, particularly near the Town Center.		
• Ensure that sidewalks/walkways are planned for and installed at needed locations to provide for pedestrian safety.	DPW, Police	2
• Develop a pathway plan along Route 111.	DPW	2
• Develop a sidewalk design that is sensitive to Boxborough's rural residential character.	DPW, PB	2
Increase parking capacity at Blanchard Memorial School and/or at the Boxborough Fire Station and encourage more efficient use of available parking to improve operations and safety at the school.		
▪ Improve signage on the u-shaped driveway at the school's main entrance to encourage use of all available parking spaces.	SCH, DPW	1
▪ Provide police or school personnel to direct drivers to all available parking spaces.	POL, SCH	1
▪ Increase parking on school property and/or at the Fire Station.	SCH, DPW, F	1

Traffic and Circulation Action Plan - Continued	Party Responsible	Time Frame
Provide a local road network that can safely accommodate the demands of vehicular and pedestrian traffic and allow for town services and emergency response to be carried out quickly and effectively.		
<ul style="list-style-type: none"> Continue to require new roadways to meet design standards that allow for safe travel and full access of emergency and service vehicles. 	PB, DPW	1
<ul style="list-style-type: none"> Require sidewalks/pathways, where appropriate, along major roadways. 	PB	2
<ul style="list-style-type: none"> Evaluate the construction of cul-de-sacs in light of the need to promote efficient town services. 	PB, DPW	Ongoing
Provide a logical local road network to help improve traffic flow and ease town services.		
<ul style="list-style-type: none"> Provide a local road network that coordinates subdivision roads with existing and future roadways. 	PB, DPW	Ongoing
<ul style="list-style-type: none"> Carefully review subdivision plans to consider future roadway connections. These plans should be laid out to allow for road extensions through adjacent vacant property that may be developed in the future to reduce the number of cul-de-sacs and additional access points on existing roads. 	PB	3
Mitigate all impacts of future developments to maintain existing roadway operations.		
<ul style="list-style-type: none"> Require that development projects and their associated mitigation provide acceptable operating conditions and offset project impacts as completely as possible. 	PB, DPW	Ongoing
<ul style="list-style-type: none"> Require developers to fund project reviews by independent consultants when the town staff is not available. 	PB	Ongoing
<ul style="list-style-type: none"> Develop a town-wide traffic model to monitor the impacts of development created within the town and as part of regional growth. 	DPW, BOS, TA	2
Encourage alternatives to motor vehicle transportation.		
<ul style="list-style-type: none"> Require Transportation Demand Management plans as part of the approval process for major developments. 	PB	Ongoing
<ul style="list-style-type: none"> Encourage the use by businesses of private shuttle busses to transportation nodes. 	PB	Ongoing
<ul style="list-style-type: none"> Encourage employees to use bicycles and motorcycles by providing bicycle facilities. 	PB	Ongoing
Reduce the impact of non-residential developments		
<ul style="list-style-type: none"> Require Transportation Demand Management plans as part of the special permit and site plan review approvals for industrial and commercial uses. 	PB	1

Traffic and Circulation Action Plan - Continued	Party Responsible	Time Frame
<ul style="list-style-type: none"> Encourage the use of shuttle buses to transportation nodes. 	PB	1
Encourage residents to use alternatives to automobile vehicles.		
<ul style="list-style-type: none"> Provide safe pathways for pedestrians and bicyclists along Route 111. 	BOS, DPW	1
<ul style="list-style-type: none"> Encourage use and expansion of trail systems through the town. 	CC	Ongoing
<ul style="list-style-type: none"> Create bicycle lanes on Route 111 and identify other routes accommodate through bicycle traffic. 	BOS, DPW	2

CONCLUSION

The people of Boxborough have stated that they recognize change, but they are concerned because they want to manage change. Their vision for the future is the foundation and guiding force of this master plan. The preceding chapters document what Boxborough has and what it needs as defined through the master plan process. Included in the chapters are recommendations to help the community reach its future vision, protect the character that the residents love and provide the services they need.

Appendix 6-1
Historic Properties Master List

MASTER LIST

ROAD
STREET

NUMBER	STYLE	OWNER	AGE	Houses & Home sites #
BARTEAU	COLONIAL	HAMILTON	1815	4
BURROUGHS	179 SCHOOL HOUSE #4 308 STUCCO HOUSE 326 CENTER CHIMNEY CAP/BUNGALOW 761 DORMED CAPE 367 FARMHOUSE WITH COLONADE PORCH 370 CLASSIC COLONIAL 761 DORMED CAPE 15 COLONIAL w/ FOUR CHIMNEYS 20 BARN 493	STEIN/GARRISON WILFERT R.K. LANG SHEEHAN FOSTER	1867 1846 1735 1846 1795 1930 1789	38 40 29 19 22
CODMAN HILL				
CUNNINGHAM	81 COLONIAL GAMBREL BARN	GUTIERREZ CORP. GUTIERREZ CORP.	1729/1776 c.1900	15
DAVIDSON	8 FARMHOUSE 61 COLONIAL 86 COLONIAL 160 SALTBOX-REPLICA?	SMITH CHUNN/KANTZER HARBISON	1798 1731	92 93
FLAGG HILL	205 COLONIAL	BJORKLUND	1770-1784?	32
HILL	8 COLONIAL SCHOOL HOUSE #1 187 COLONIAL 214 COLONIAL 429 COLONIAL 438 COLONIAL	MUNN RADLO/HUNTLEY JOHNSON SUMMERS	1782 1770 1730/1840 1784 1833	14 13 5 53 55

1730 parts
in old el

4 1/4 M
#

ROAD

NUMBER STYLE

OWNER

AGE

Hill (on Lott's)

HERB GARDEN
MEETING HOUSE
NORTH CEMETERY

462 COLONIAL

533 FEDERAL

613 GAMBREL

657 GABLE

796 FEDERAL

799 COTTAGE AND SCHOOL HOUSE

827 BOAZ BROWN COMPLEX

828 FARMHOUSE

989 GEORGIAN

1008 FARMHOUSE

OPP. 1052 LIMESTONE FARM

1098 FARMHOUSE

NEXT 1113 OLD BARN

TOWN

TOWN

TOWN

Coolidge
Hanna

GOLDEN

Avery

~~FOOT~~ Eckroth

ROBINSON

SINGER

MAZI

HILBERG

LIBERTY SQUARE

4 --

COLONIAL (Brickender)

409 BUNGALOW

459 DORMED CAPE

555 COLONIAL FARMHOUSE

570 COLONIAL HALF HOUSE

630 SCHOOL HOUSE #3

908 CROSS GABLE FARMHOUSE

986 GREEK REVIVAL

1018 GREEK REVIVAL

1190

1193 DUTCH GAMBREL

HERSHBERG

COBLEIGH

WHITE

VORCE

DUNK AND BUBBLE

HOWES

ZAMPIELLO

COUTTS

MCNAMARA

LITTLEFIELD & PART DEPT

232 BUNGALOW

239 BUNGALOW

394 VICTORIAN

PAINE

WAY

FRASIER

1843

96 site

56

57

60

62

63

64

65

67

68

69

71

86

83

81

81

79

77

Road	Number	Style	Owner	Age	Ht Ht
DEPOT	447	MODERN	TAUB		
	69		KRUSEN	1844-5	44
	234	PORCHED FARMHOUSE	VERACKA	1851	91
	241	VICTORIAN	CURTIS	1890	
	875		GILLIGAN	1930	
MASS AVE (111)	1001	FARMHOUSE	SCARLET	1875	Parker farm - 1875
	709		PARSONAGE	1858	
		CHURCH	UCC	1834	
		BRICK COLONIAL	LYONS	1832	42
	1526	COLONIAL	LYONS	1832	43
MIDDLE			RICHARDSON STORE	1930	
			PARSONS	1526	18
	29	QUEEN ANNE	TOWN HALL	1901	
	29	WORLD WAR ONE MEMORIAL		1919	
	50			1790	44
	71		COBLEIGH		
	81		VINAL		
		FARMHOUSE WITH BARN	RICHARDSON	1866	45 site
	317		NEVILLE		
	435	FARMHOUSE STYLE	ELLENBASS	1928	50 site
PICNIC		COLONIAL	STEELE	1768	52
	593	MULTI GABLE, BAY WINDOWS	FALMADGE Hood	1794	54
		SCHOOL HOUSE #2	ROBINSON	1783	original, 1857 present structure
	3	CLASSIC COLONIAL	CHERNAK	1752	27
	284	STANE FOUNDATION, CONCRETE HOUSE	HAMILTON	1912-19	26 site
PINE HILL	118	COTTAGE	GAUBATZ/KROLL	1940	
	137		HUDGINS		

ROAD	NUMBER	STYLE	OWNER	AGE	HEH
SARGENT	36	MODERN 2 STORY	GAEBEL	1920	
		MODERN 2 OR 3 STORY	GRALA		
STOW	70	STONE CALIFORNIA BUNGALOW	LYONS	1920	
	432	COLONIAL	J.L. REALTY TRUST		41?
	526		DAVIDSON	1911-1914	
	579		WEST	1847	37
			RUDENKO		
SUMMER	23	MULTI-GABLED FARMHOUSE	VORCE	1940	
	150	CAPE AND EXPANSION	COFFEY	1767	34
	BLDG. 6	GRANITE FOUNDATION, OLD BARN	VARNO INDUST. PROD	1850	33
WETHERBEE		COLONIAL	DELANO	1770/1811	59
WHITCOMB		SHERRY HOUSE	BARTLETT	1882	
			SAWYER	1771	7

Appendix 6-2
Community Values Worksheet

Worksheet for Values to be considered in Natural Resource Sensitivity Analysis for Open Space Acquisition Strategy

Community Values Rating

This step is intended to be a community-wide rating of the importance of the various "public interest values" to Boxborough. This rating should be completed without any specific parcel of land in mind, and can be completed at any time. Ultimately the rating will be used in determining how specific areas in Boxborough meet community-defined needs.

Rate each of the listed values on a scale of 0-100 points so that the total of the scores add up to 100 points. The rating is a relative weighting of each value (as a percentage of the whole). Some functions or values may be of no importance to a community, while others may have significant importance. Ideally, this rating will be performed by a cross-section of persons that represent the community. Please use only whole numbers.

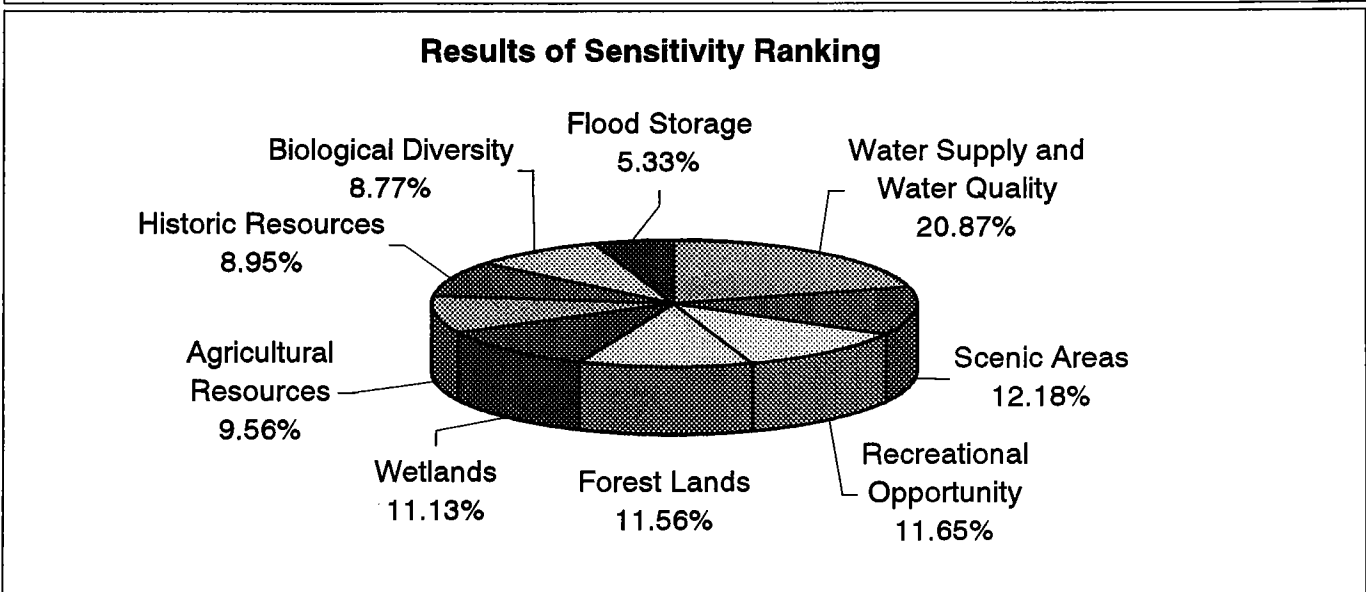
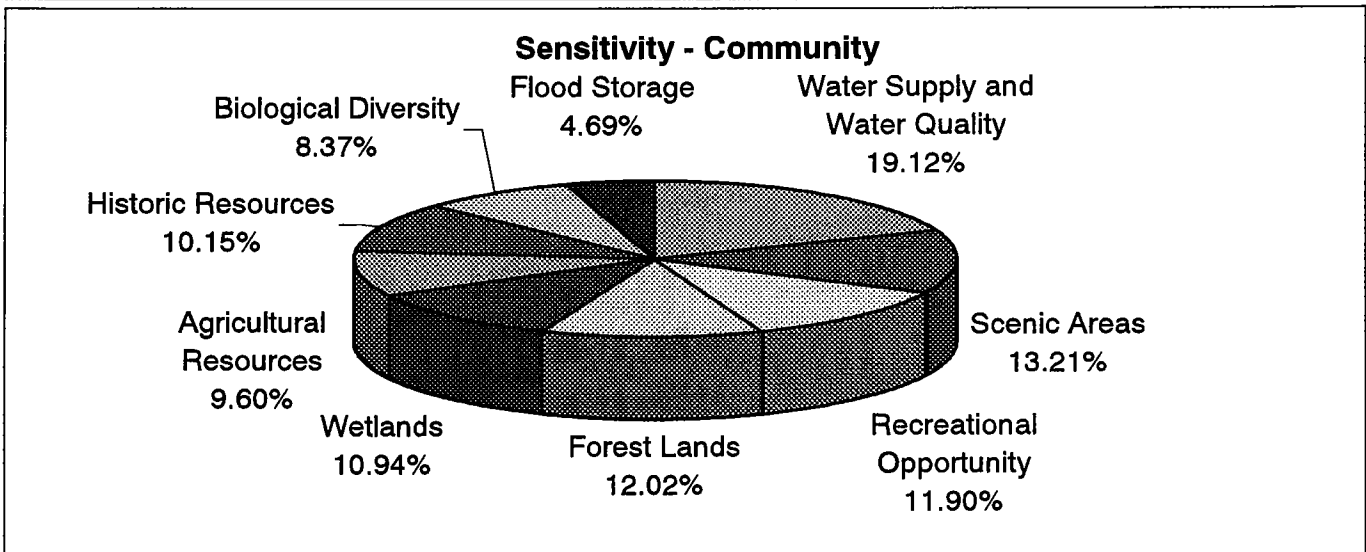
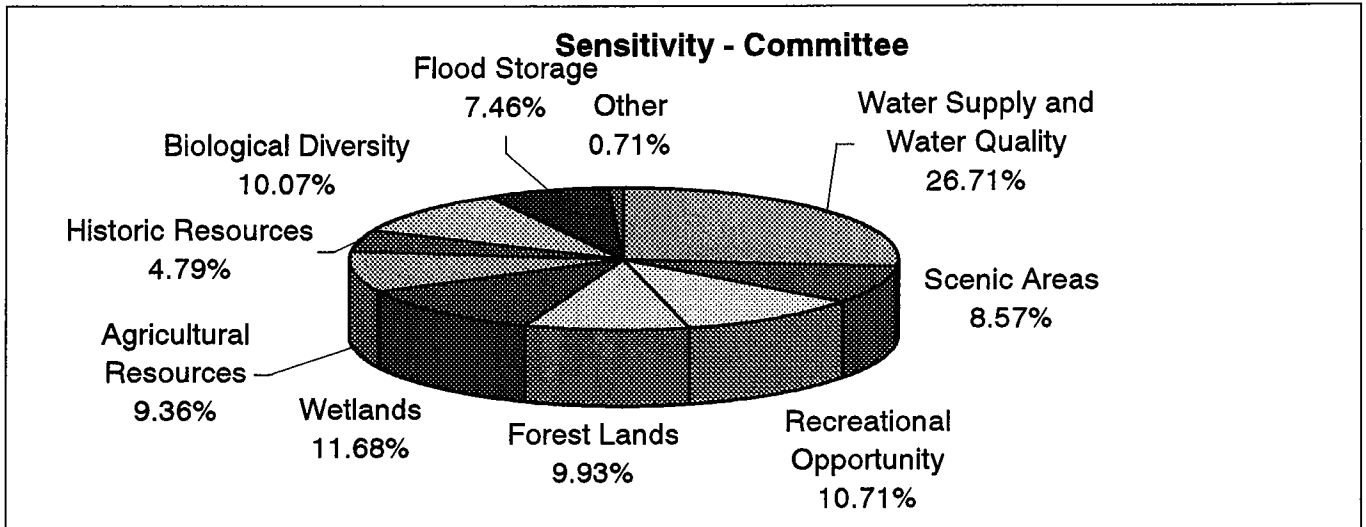
- Scenic Areas _____
- Historic Resources _____
- Forest Lands _____
- Agricultural Resources _____
- Recreational Opportunity _____
- Water Supply and Water Quality _____
- Wetlands _____
- Flood Storage _____
- Maintenance of Biological Diversity/Wildlife Habitat _____
- Other _____

Total 100 pts

COMPARING OPEN SPACE VALUES	WHAT WE MEAN BY EACH ITEM
Scenic Areas	Parcels with a significant view from street or existing trail. Scenic Roadways. Distinctive visual elements in town.
Historic Resources	Known historic, cultural, or archaeological value. Old foundation sites. Indian sites.
Forest Lands	Chapter 61 lands. Significant stands of trees.
Agricultural Lands	Chapter 61A or APR lands. Land currently used for agricultural purposes.
Recreational Opportunity	Chapter 61B lands. Land that draws people for recreational activities.
Water Supply and Water Quality	Aquifers, Zone II (area of aquifer that contributes water to the well under severe pumping conditions), Interim wellhead protection area (set radius around well for protection area before zone II is determined mathematically)
Wetlands	Existing streams, wetlands both state and locally regulated.
Flood Storage	100-year and 500-year flood zones.
Biological Diversity	State listed habitat areas. Any local habitat areas. Certified vernal pools

Appendix 6-3
Results

Boxborough Master Plan



Boxborough Master Plan

	Committee (14)	Community (48)	total	Avg.	Adj. Avg.
Water Supply and Water Quality	26.71	19.12	1291.65	20.83	20.87
Scenic Areas	8.57	13.21	754.10	12.16	12.18
Recreational Opportunity	10.71	11.90	720.96	11.63	11.65
Forest Lands	9.93	12.02	715.81	11.55	11.56
Wetlands	11.68	10.94	688.79	11.11	11.13
Agricultural Resources	9.36	9.60	591.97	9.55	9.56
Historic Resources	4.79	10.15	554.15	8.94	8.95
Biological Diversity	10.07	8.37	542.81	8.76	8.77
Flood Storage	7.46	4.69	329.76	5.32	5.33
Other	0.71		10.00	0.16	
					100.00

Committee Rank

Water Supply and Water Quality	1	26.71	99.84
Wetlands	2	11.68	
Recreational Opportunity	3	10.71	
Biological Diversity	4	10.07	
Forest Lands	5	9.93	
Agricultural Resources	6	9.36	
Scenic Areas	7	8.57	
Flood Storage	8	7.46	
Historic Resources	9	4.79	
Other	10	0.71	

Community Rank

Water Supply and Water Quality	1	19.12
Scenic Areas	2	13.21
Forest Lands	3	12.02
Recreational Opportunity	4	11.90
Wetlands	5	10.94
Historic Resources	6	10.15
Agricultural Resources	7	9.60
Biological Diversity	8	8.37
Flood Storage	9	4.69

Boxborough Master Plan

RAW DATA

Community Value	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Scenic Areas	10	20	20	5	10	15	10	0	20	10	10		30	10	15	10	20	20	5	20	20	15	15	10	0	5	30	5	10	10	10
Historic Resources	5	10	5	5	5	10	5	0	20	10	3			5	10	10	5	35	5	5	30	10	10	10	5	5	40	30	10	15	5
Forest Lands	15	10	10	5	15	15	5	15	20	10	15		30	10	15	20	15	5	5	5	10	10	15	10	5	20	0	10	10	10	5
Agricultural Resources	15	15	10	15	15	10	5	15	5	13	18			5	10	10	20	10	10	5	5	15	5		5	10	10	0	10	5	5
Recreational Opportunity	10	10	5	10	15	10	5	15	5	12	5	20	20	15	10		5	5	10	5	5	10	10	25	10	30	10	15	20	30	5
Water Supply and Water Quality	25	20	30	25	20	15	25	15	20	15	19			20	10	10	15	30	30	25	20	10	20	25	20	10	10	30	20	15	10
Wetlands	10	5	10	15	10	10	10	15	10	10	15		20	15	10	20	5	0	20	15	0	10	10	10	20	5	0	5	10	5	5
Flood Storage	5	5	5	10	0	10	5	0	0	5	5			5	5	10	5	0	5	5	0	10	5		5	5	0	5	0	0	5
Biological Diversity	5	5	5	10	10	5	20	10	0	10	10			15	15	10	10	0	10	15	10	10	10	10	10	10	0	0	10	15	5
Other- Conservation/Land for passive recreation							10																								
Other- Land to connect town trails								15																	20						
Other- Current Residential Areas												80																			
Other- Protection of Rights of Owners																															45
Other- Good Places to Walk add to recreation if desired, could also be forest paths																															
Total	100	100	100	100	100	100	100	100	100	95	100	100	100	100	100	100	100	105	100	100	100	100	100	100	100	100	100	100	100	105	100

ADJUSTED

Community Value	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Scenic Areas	10	20	20	5	10	15	10	5	20	10.53	10		30	10	15	10	20	19.05	5	20	20	15	15	10	10	5	30	5	10	9.52	
Historic Resources	5	10	5	5	5	10	5	0	20	10.53	3			5	10	10	5	33.33	5	5	30	10	10	10	5	5	40	30	10	14.29	
Forest Lands	15	10	10	5	15	15	5	15	20	10.53	15		30	10	15	20	15	4.76	5	5	10	10	15	10	5	20	0	10	10	9.52	
Agricultural Resources	15	15	10	15	15	10	5	15	5	13.68	18			5	10	10	20	9.52	10	5	5	15	5		5	10	10	0	10	4.76	
Recreational Opportunity	10	10	5	10	15	10	15	25	5	12.63	5		20	15	10		5	4.76	10	5	5	10	10	25	20	30	10	15	20	28.57	
Water Supply and Water Quality	25	20	30	25	20	15	25	15	20	15.79	19			20	10	10	15	28.57	30	25	20	10	20	25	20	10	10	30	20	14.29	
Wetlands	10	5	10	15	10	10	10	15	10	10.53	15		20	15	10	20	5	0.00	20	15	0	10	10	10	20	5	0	5	10	4.76	
Flood Storage	5	5	5	10	0	10	5	0	0	5.26	5			5	5	10	5	0.00	5	5	0	10	5		5	5	0	5	0	0.00	
Biological Diversity	5	5	5	10	10	5	20	10	0	10.53	10			15	15	10	10	0.00	10	15	10	10	10	10	10	10	0	0	10	14.29	
Total	100	100	100	100	100	100	100	100	100	100	100		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	

* How columns were adjusted
Column 7 - Other added to recreation
Column 8 - Other (5 to scenic; 10 to recreation)
Columns 10,18,30 - Adjusted because total didn't equal 100 so divided percentage by total and multiplied by 100.
Columns 12 and 31 - Thrown out because other answer didn't seem to fit
Column 25 - Other (10 to scenic; 10 to recreation)
Column 45 - Other (5 to forest; 5 to recreation)

Boxborough Master Plan

RAW DATA

Community Value	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Scenic Areas	20	10	10	15	10	0	10	20	20	10	10	10	20	5	15	20	20		15
Historic Resources	20		5	10	10	1	10	10	15	10	20	15	20	0	5	10			10
Forest Lands	2	20	15	15	10	5	5	10	5	10	10	20	5	15	10	20	20	20	15
Agricultural Resources	20	10	5	5	10	10	10	5	5	20	10	10	15	15	10			20	10
Recreational Opportunity	5		10	5		20	10	10	15	10	20	5	10	10	10		30	20	10
Water Supply and Water Quality	15	30	20	15	20	40	35	20	20	10	10	10	10	15	20	20	20	20	20
Wetlands	5	15	15	20	20	15	5	5	20	20	10	10	10	10	10	20	5		10
Flood Storage	5	15	10	5		5	5	10	0	10	10	10	5	5	10				5
Biological Diversity	8		10	10	20	4	10	10	0			10	5	15	10	10	5	20	5
Other- Conservation/Land for passive recreation																			
Other- Land to connect town trails																			
Other- Current Residential Areas																			
Other- Protection of Rights of Owners																			
Other- Good Places to Walk add to recreation if desired, could also be forest paths														10					
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

ADJUSTED

Community Value	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	SUM	
Scenic Areas	20	10	10	15	10	0	10	20	20	10	10	10	20	5	15	20	20		15	634.0977	13.21
Historic Resources	20		5	10	10	1	10	10	15	10	20	15	20	0	5	10			10	487.1454	10.15
Forest Lands	2	20	15	15	10	5	5	10	5	10	10	20	5	20	10	20	20	20	15	576.812	12.02
Agricultural Resources	20	10	5	5	10	10	10	5	5	20	10	10	15	15	10			20	10	460.9699	9.60
Recreational Opportunity	5		10	5		20	10	10	15	10	20	5	10	15	10		30	20	10	570.9649	11.90
Water Supply and Water Quality	15	30	20	15	20	40	35	20	20	10	10	10	10	15	20	20	20	20	20	917.6466	19.12
Wetlands	5	15	15	20	20	15	5	5	20	20	10	10	10	10	10	20	5		10	525.2882	10.94
Flood Storage	5	15	10	5		5	5	10	0	10	10	10	5	5	10				5	225.2632	4.69
Biological Diversity	8		10	10	20	4	10	10	0			10	5	15	10	10	5	20	5	401.812	8.37
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	4800	100.0

Appendix 7-1
Boxborough Open Space

Appendix Boxborough Open Space

Location	Acres	Name
MUNICIPAL LAND		
1. 10&11-5-T321	20.22	Blanchard School
2. 7-5-T122	1.02	Library
3. 3-3-T122	0.59	Town Common
4. 10-4-T175	2.00	Firehouse
5. 10-4-172.1	1.13	Police Station
6. 11-5-T319	94.43	Hager Land
7. 7-5-T320	5.31	Cobleigh Land
8. 7-3-134	41.96	Community Garden
9. 1-2-112	6.00	Municipal Land
10. 6-5-T330, T331	2.91	Town Hall
11. 6-5-322	2.30	Highway Barn
12. 3-3-T208	0.92	North Cemetery
13. 6-4-T211	6.67	South Cemetery
14. 1-1-T140, T143-T147	25.44	Transfer Station
15. 7-5-226	1.15	Leone Land
16. 5-2-169D-169E	1.13	Robinson Road Land
17. 7-3-125	36.19	Steele Farm
18. 7-3-127, 128, 7-5-232	25.65	Picnic Street Trust
19. 9&10-4-294	36.00	Flagg Hill
20. 3-3-164	0.53	Brooks
21. 8-5-166, 8-5-173-177	27.00	Hetz
Total Municipal	338.55	
CONSERVATION LAND		
22. 3-1-170	11.05	Pettingel Park
23. 12-6-182	2.53	Barker Place
24. 2-2-T136, T109, 2-4-109&1-2-133.2	207.02	Wolf Swamp
25. 11-6-T309, 311, 12-6-351, 350C	38.19	Half Moon Meadow
26. 6&10-4-244	35.43	Flerra Meadows
27. 11-6-218.1	10.82	Rubin Land
28. 8-6-101	10.34	Hartwell Land
29. 2-3-T115	31.52	Livermore Land
30. 8-5-161	64.58	Robinson Land
31. 7-5-T158.2	5.17	Birchwoods
32. 11-6-261, 262	1.13	Jenks
33. 12-6-210.6	23.04	Dawson Land
34. 12-6-172.2	11.97	Potts
35. 11-5-311	6.11	DiBiase Land
36. 11-6-348, 349	1.84	Sudbury Valley
37. 3-3-165.2	28.11	Elizabeth White
38. 7-5-193	16.70	Patch Hill (Atwood)

Appendix Boxborough Open Space

Location	Acres	Name
39. 7-5-130A	4.63	Silbury Hills
40. 12-6-194.1-194.3	35.32	Rolling Meadows
41. 5-2-189B	20.30	Flannery Land
42. 3-3-222.2	16.19	Fisk Land
43. 11-5-241.64	7.01	Biotti Land
44. 6-3-124A	3.99	Meetinghouse Lane
45. 5-2-170E	5.03	Sylvan Springs
46. 5-2-169.49-4	7.14	Lot 49-4 Old Harvard
47. 11-6-549	4.91	Parcel A
48. 2-3-119.A	0.41	Whitcomb land
49. 10-11-294	36.21	Flagg Hill Land
50. 5&6-2-175.6C	20.49	Fierra Estates Land
51. Parcels C,D1	6.32	Lydia Lee Delano
52. 1-2-118	22.07	Sudbury Valley
53. 10-4-231.10	0.98	Deck House Lot
54. 7-5-201.2&201A	2.41	Patch Hill Road Land
55. Barteau Lane/Hill Rd.	24.14	High Pastures Land
56. Delano Land	21.97	Delano Land
57. 11-6-350	20.00	Grady Land; Boxborough Conservation Trust
Total Conservation	765.07	

SEMI-PUBLIC LAND

58. 4-1-169, 174, 176 ,178, 178A, 179, 180, 182, 184, 185, 190	56.00	Harvard Sportsmen Club
59. 3-1-183, 189, 193.1, 193.2	82.00	Beaver Valley Preserve
Total Semi-Public	138.00	

STATE LAND

60. 1-2-103-109, 123-124	56.00	SUASCO Easement
61. 8&12-6-239.1	18.50	Berton Land
Total State	74.50	

PRIVATE RECREATION

62. 11-4-288, 289	16.49	Nashoba Valley Olympia
63. 2-1-149	6.86	Harvard Ridge Swim and Tennis
Total Private Recreation	23.35	

GRAND TOTAL **1339.47**

Appendix 7-2
Chapter Lands

Chapter Lands FY'01

parcel-ld	use	str#	street	owner	acres
037/007.5-0223-0002.0	16	875	DEPOT RD	WILBERT, MATTHEW M & DEBORAH J	25.79
037/008.3-0183-0001.0	16	1164	HILL RD	TAYLOR, MARION T &	11.71
037/008.6-0132-0001.0	16	1033	LIBERTY SQ RD	PARSONS, WAYNE R	11.39
037/004.1-0178-0000.0	16	260	LITTLETON COUNTY RE	HARVARD SPORTSMENS CLUB, INC	42.00
037/006.2-0180-0000.0	601	94	CHESTER RD	MORAN, PATRICK T & HARRIET M	17.59
037/007.5-0227-0002.0	601	0	DEPOT RD	VELEY, ARDEN &	16.01
037/007.5-0236-0000.0	601	0	DEPOT RD	CAMPBELL, CARLETON E & CLYOLYN N	35.64
037/009.4-0332-0000.0	601	0	FLAGG HILL RD	TREFRY, ARTHUR W & ESTHER H	22.04
037/004.1-0176-0000.0	601	0	HARVARD/LITTLETON	HARVARD SPORTSMENS CLUB, INC	49.54
037/001.2-0114-0000.0	601	0	HAZARD LN	SHERRY, RICHARD D	3.41
037/001.2-0115-0000.0	601	0	HAZARD LN	SHERRY, RICHARD D	12.33
037/001.2-0116-0001.0	601	0	HAZARD LN	SHERRY, RICHARD D	14.16
037/004.1-0179-0000.0	601	0	LITTLETON LINE	HARVARD SPORTSMENS CLUB, INC	3.33
037/006.4-0120-0000.0	601	0	MASS AV	MARCUS FAMILY REALTY TRUST	27.00
037/004.1-0174-0000.0	601	0	OLD LITTLETON RD	HARVARD SPORTSMENS CLUB, INC	4.30
037/001.2-0208-0000.0	601	0	RT 495	SHERRY, RICHARD D	4.00
037/004.1-0180-0000.0	601	0	RT 495	HARVARD SPORTSMENS CLUB, INC	11.91
037/004.1-0182-0000.0	601	0	RT 495	HARVARD SPORTSMENS CLUB, INC	13.96
037/004.1-0184-0000.0	601	0	RT 495	HARVARD SPORTSMENS CLUB, INC	24.57
037/004.1-0185-0000.0	601	0	RT 495	HARVARD SPORTSMENS CLUB, INC	12.00
037/004.3-0169-0000.0	601	0	RT 495	HARVARD SPORTSMENS CLUB, INC	6.90
037/012.6-0199-0000.0	601	0	SARGENT RD	CAMPBELL, CARLETON E & CLYOLYN N	20.52
037/012.6-0206-0000.0	601	0	SARGENT RD	CAMPBELL, CARLETON E & CLYOLYN N	0.83
Total Chapter 61 Land					390.93
037/010.4-0213-0000.0	17	370	BURROUGHS RD	SHEEHAN, SYLVIA L	59.00
037/007.5-0343-0000.0	17	120	COBLEIGH RD	FOLLETT, DAVID R &	12.49
037/012.6-0187-0000.0	17	0	DEPOT RD	KRUSEN, GEORGE C II & BETSEY M	30.00
037/012.6-0242-0000.0	17	69	DEPOT RD	KRUSEN, GEORGE C II & BETSEY M	15.03
037/004.3-0167-0000.0	17	0	HILL RD	RIDGE HILL REALTY COMPANY	46.99
037/002.3-0116-0000.0	17	187	HILL RD	WETHERBEE FARMS REALTY COMPANY	15.87
037/003.3-0163-0001.0	17	604	HILL RD	DELANO, JOHN PHILLIP	26.67
037/003.3-0192-0000.0	17	828	HILL RD	ROBINSON, GEORGE W & BARBARA	8.50
037/010.4-0267-0001.0	17	0	MASS AV	VORCE, RAYMOND M JR	4.08
037/002.3-0156-0000.0	17	1197	MASS AV	CANN REALTY TRUST	16.30
037/007.3-0135-0000.0	17	276	MIDDLE RD	RICHARDSON, CLYDE L & VIRGINIA B	18.57
037/012.6-0354-0005.0	17	142	SARGENT RD	IDYLWILDE FARM INC	15.40
037/011.6-0346-0001.0	17	392	SARGENT RD	DAVIS, JOHN R & ROBIN L HACKING-	7.88
037/010.4-0239-0021.0	17	540	STOW RD	SUTCLIFFE, WILLIAM M & EILEEN C	6.73
037/012.6-0258-0000.0	712	0	LITTLEFIELD RD	NAPOLI, THOMAS F & KATHARINE L S	25.37
037/001.2-0103-0001.0	714	0	ELDRIDGE RD	SPAULDING, ARTHUR J & MARIE	14.76

Chapter Lands FY'01

parcelId	use	str#	street	owner	acres
037/001.2-0103-0002.0	714	0	ELDRIDGE RD	SPAULDING, ARTHUR J & MARIE	2.40
037/012.6-0184-0000.0	717	0	DEPOT RD	KRUSEN, GEORGE C II & BETSEY M	0.50
037/012.6-0247-0000.0	717	0	LITTLEFIELD RD	KRUSEN, GEORGE C II & BETSEY M	19.25
037/011.4-0285-0000.0	717	0	MASS AV	VORCE, RAYMOND M JR	7.60
037/012.6-0208-0000.0	717	0	SARGENT RD	KRUSEN, GEORGE C II & BETSEY M	14.50
037/003.5-0156-0000.0	718	0	HILL RD	RIDGE HILL REALTY COMPANY	5.71
037/008.5-0167-0000.0	718	0	LIBERTY SQ RD	COUTTS, LORNA M	10.89
037/004.1-0187-0000.0	720	0	RT 495	RIDGE HILL REALTY COMPANY	27.02
037/012.6-0183-0000.0	722	0	DEPOT RD	KRUSEN, GEORGE II	7.75
Total Chapter 61A Land					419.26
037/008.3-0176-0000.0	18	1178	HILL RD	HUGEL, FRED & MARGUERITE	12.52
037/011.6-0336-0000.0	18	297	LIBERTY SQ RD	MITCHELL, ANNA S	30.09
037/006.4-0166-0001.0	18	72	STOW RD	FRANCIS G LYONS FAMILY TRUST	11.05
037/009.2-0189-0000.A	803	0	STOW RD	MINUTE MAN AIR FIELD, INC	7.80
037/009.2-0196-0000.0	803	0	STOW RD	MINUTE MAN AIR FIELD, INC	9.78
037/009.2-0206-0000.0	803	0	STOW RD	MINUTE MAN AIR FIELD, INC	15.24
037/005.2-0189-0001.0	803	8	TAMARACK LA	MINUTE MAN AIR FIELD, INC	1.14
037/005.2-0189-0002.0	803	22	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.93
037/005.2-0189-0003.0	803	38	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.93
037/005.2-0189-0004.0	803	54	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.93
037/005.2-0189-0005.0	803	66	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.92
037/005.2-0189-0006.0	803	80	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.99
037/005.2-0189-0007.0	803	92	TAMARACK LA	MINUTE MAN AIR FIELD, INC	1.84
037/005.2-0189-0008.0	803	106	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.92
037/009.2-0189-0009.0	803	114	TAMARACK LA	MINUTE MAN AIR FIELD, INC	5.40
037/009.2-0189-0010.0	803	120	TAMARACK LA	MINUTE MAN AIR FIELD, INC	4.60
037/005.2-0189-0011.0	803	126	TAMARACK LA	MINUTE MAN AIR FIELD, INC	1.84
037/005.2-0189-0012.0	803	134	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.92
037/005.2-0189-0013.0	803	150	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.95
037/005.2-0189-0014.0	803	164	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.95
037/005.2-0189-0015.0	803	178	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.95
037/005.2-0189-0016.0	803	192	TAMARACK LA	MINUTE MAN AIR FIELD, INC	0.92
Total Chapter 61B Land					111.61
Total Chapter Land					921.80

Appendix 7-3
Land Acquisition Strategy

LAND ACQUISITION STRATEGY
Boxborough Master Plan

Chapter	Sensitivity Value	Rank	Area	Size	Contiguity	Road frontage	Envir. (Wetlands)	Impact	Water Supply	Flood Potential	Scenic Views	Historic Resources	Biodiversity	Proximity to Town Center	New Sensitivity Value	New Rank	Original Rank
61B	52.4006	5	27.67	3	3	2	2	2	2	3	1	1	3	1	11324.53	1	5
61	66.5103	2	39.04	3	3	1	2	3	3	3	1	1	3	1	10783.669	2	2
61A	21.1723	22	17.58	2	1	2	2	3	3	3	3	1	3	1	4582.2168	3	22
61B	27.1346	19	60.37	3	3	2	1	3	3	3	1	1	1	1	4398.8052	4	19
61	52.8880	4	50.19	3	3	1	1	3	3	3	1	1	3	1	4292.928	5	4
61A	51.7442	6	25.16	3	3	1	1	3	3	3	1	1	1	1	4194.2802	6	6
61A	41.6350	7	22.21	3	1	2	2	1	2	2	3	1	3	1	3000.72	7	7
61A	41.3967	8	15.09	2	2	2	1	3	3	3	1	1	3	2	2998.5624	8	8
61	26.2143	20	14.44	2	2	2	2	1	3	3	2	1	3	2	2522.5728	9	20
61	29.8583	17	34.78	3	3	2	1	2	2	2	1	1	2	2	2157.7976	10	17
61	52.9928	3	15.40	2	3	1	2	1	1	3	1	1	3	1	1910.7408	11	3
61A	39.5209	9	15.44	2	2	2	1	2	2	1	3	2	1	2	1905.0032	12	9
61A	30.3937	16	27.03	3	2	2	2	1	1	2	1	1	3	1	1461.8976	13	16
61	19.1332	27	14.84	2	3	2	2	1	1	3	1	1	1	2	1379.5904	14	27
61	18.8756	28	20.08	3	1	2	2	1	1	3	2	1	1	1	1360.0432	15	28
61	70.7250	1	3.50	1	3	1	1	3	3	2	1	1	3	1	1282.05	16	1
61A	32.7074	14	62.33	3	2	2	1	1	1	3	1	1	1	2	1179.4664	17	14
61A	33.0769	13	11.15	2	2	2	2	1	1	2	1	1	1	3	1061.4608	18	13
61	18.3629	29	21.75	3	3	2	2	1	3	1	1	1	1	2	997.5966	19	29
61	18.1300	31	27.09	3	3	2	1	1	1	1	3	2	1	3	985.02	20	31
61A	19.6336	24	12.34	2	2	2	1	1	1	2	3	2	1	1	944.4128	21	24
61B	36.9657	10	13.87	2	1	2	2	1	1	1	3	2	1	3	893.1768	22	10
61	22.6380	21	27.88	3	1	2	2	1	1	1	3	1	1	3	817.968	23	21
61	31.3713	15	36.22	3	1	2	2	1	1	2	1	2	1	1	754.9112	24	15
61A	27.6750	18	11.90	2	1	2	1	1	1	2	3	2	3	1	670.2	25	18
61A	18.0950	32	7.35	1	2	2	1	1	1	3	3	1	1	1	652.42	26	32
61	20.0050	23	24.20	3	1	2	1	1	1	1	3	1	1	1	361.09	27	23
61A	15.6500	35	45.28	3	1	2	1	1	1	1	3	1	1	1	282.7	28	35
61	18.2850	30	19.89	2	3	2	1	1	1	1	1	1	1	1	220.42	29	30
61A	33.0950	12	3.94	1	1	1	1	2	2	3	1	1	1	2	202.57	30	12
61A	19.2650	26	13.76	2	1	2	1	2	2	1	1	1	1	1	156.12	31	26
61A	17.3350	33	7.99	1	2	1	2	1	1	2	1	1	2	1	140.68	32	33
61A	33.3533	11	2.24	1	1	2	1	2	2	1	1	1	1	2	137.4132	33	11
61A	19.3040	25	5.09	1	1	2	1	1	1	1	3	1	1	1	116.824	34	25
61A	16.3960	34	26.42	3	1	1	1	1	1	2	1	1	1	1	99.376	35	34
61A	15.3967	36	20.19	3	1	2	1	1	1	1	1	2	1	3	98.3802	36	36
61A	13.9450	37	7.40	1	1	2	1	1	1	1	1	1	1	1	28.89	37	37
61A	13.1133	38	12.59	2	1	1	1	1	1	1	1	1	1	1	27.2266	38	38
61	11.5600	39	9.73	1	1	2	1	1	1	1	1	1	1	1	24.12	39	39

Appendix 8-1
Community Impact Spreadsheets

Table 8-1: Community Impact Assessment -
10-Year Buildout

Existing Conditions			Added in Future (2010)			Average of the MAPC and MISER projections		
2000 Population	4,868		Buildout Population	6,236		Extrapolated		
2000 Households	1931		Buildout Households	2,121		Ashton's Enrollment Projections		
2000 School Age Children	1,090		Buildout School Age Children	1558		Ashton's Enrollment Projections		
2000 Elementary Age Children	631		Buildout Elemntary Age Chil	766.00		Ashton's Enrollment Projections		
FACTOR	BOXBOROUGH DATA (existing service level)		STANDARD UNIT	BOXBOROUGH Existing Conditions (2000)	ULI STANDARD	BOXBOROUGH BUILDOUT Projected Need		
SCHOOLS								
Students per Classroom	Classrooms	Students						
K-6	31	631	Students per Classroom	20.00	24	38 classrooms 32 ULI Standard		
Student-Teacher Ratio	# Students	# Teachers						
K-6	625	45	Students per Teacher	14.00	22	55 teachers 35 ULI Standard		
Total Space	Sq. Ft.	# Students						
K-6	75,210	625	Sq. Ft. per Student	120.34	90	92,177 sf school space 68,940 ULI Standard		
LIBRARY								
Book Holdings (total volumes)	28,565		Volumes per Capita	5.87	2.75-3	36,592 volumes		
Book Circulation (volumes)	38,242		Volumes per Capita	7.86	9.5	48,989 volumes		
CONSERVATION & MUNICIPAL LAND								
Land (acres)	1319		Acres per 1,000 Population	270.95	.25-8	1,690 acres of park land 4,989 ULI Standard		
POLICE								
Police Officers	10		Per 1,000 Population	2.05	2	13 police officers		
Vehicles (# of Patrol Cars)	5		Per 1,000 Population	1.03	0.6	6 police vehicles		
Facility Space (SF)	4600		Sq. Ft. per 1,000 Population	944.95	200	5,893 sf police space		
FIRE								
Personnel	4		Per 1,000 Population	0.82	1.65	10 fire personnel		
Vehicles (non-engine, non-ambi	3		Per 1,000 Population	0.62	0.2	4 fire vehicles		
Engines	5		Per 1,000 Population	1.03		6 fire engines		
Facility Space (SF)	4625		Sq. Ft. Per 1,000 Population	950.08	250	5,925 sf fire space		
EMS Calls (per year)	325		Per 1,000 Population	66.76	36.5	416 additional calls		
EMS Vehicles (ambulances)	1		Per 30,000 Population	1.00	1	0 ambulances		
WATER CONSUMPTION								
Gallons per household/day	270	521,370	Daily Gallons per Household	270	175	572,670 gals of water		
SOLID WASTE								
Landfilled (tons / day)	3.15	Daily Tons	1138 tons per year	0.000647	0.00175	4.04 Daily tons 1470 tons per year		
SEPTAGE SLUDGE								
Gallons per household per day	270	494,336	Gallons per Household/Day	270.00	n/a	572,670 gallons per day		
General Government								
Employees	13		Full Time employees	***	***	3 Full Time employees		

* This number is from 100 gallons per person per day, then multiplied by the average household size - 2.7

*** There are no standards in relation to General Government for a Town of Boxborough's size. The estimates of needs in ten years and at buildout were determined by local research

Community Impact Assessment - Town
Buildout

Existing Conditions			Future Buildout			
2000 Population	4,868		Buildout Population	6,949	Town projection	
2000 Households	1931		Buildout Households	2,832		
2000 School Age Children	1,090		Buildout School Age Children	2,180.64	extrapolated	
2000 Elementary Age Children	631		Buildout Elemntary Age Chilc	1014	Ashton's School Projections	
FACTOR	BOXBOROUGH DATA (existing service level)		STANDARD UNIT	BOXBOROUGH Existing Conditions (2000)	ULI STANDARD	BOXBOROUGH BUILDOUT Projected Need
SCHOOLS						
Students per Classroom	Classrooms	Students				
K-6	31	631	Students per Classroom	20.00	24	51 classrooms 42 ULI Standard
Student-Teacher Ratio	# Students	# Teachers				
K-6	631	45	Students per Teacher	14.00	22	72 teachers 46 ULI Standard
Total Space	Sq. Ft.	# Students				
K-6	75,210	625	Sq. Ft. per Student	120.34	90	122,021 sf school space 91,260
LIBRARY						
Book Holdings (total volumes)	28,565		Volumes per Capita	5.87	2.75-3	40,776 volumes
Book Circulation (volumes)	38,242		Volumes per Capita	7.86	9.5	54,590 volumes
CONSERVATION & SCHOOL LAND						
Land (acres)	1319		Acres per 1,000 Population	270.95	.25-8	1,883 acres of park land 5,559 ULI Standard
POLICE						
Police Officers	10		Per 1,000 Population	2.05	2	14 police officers
Vehicles (# of Patrol Cars)	5		Per 1,000 Population	1.03	0.6	7 police vehicles
Facility Space (SF)	4600		Sq. Ft. per 1,000 Population	944.95	200	6,566 sf police space
FIRE						
Personnel	4		Per 1,000 Population	0.82	1.65	11 fire personnel
Vehicles (non-engine, non-ambu	3		Per 1,000 Population	0.62	0.2	4 fire vehicles
Engines	5		Per 1,000 Population	1.03		7 fire engines
Facility Space (SF)	4625		Sq. Ft. Per 1,000 Population	950.08	250	6,602 sf fire space
EMS Calls (per year)	325		Per 1,000 Population	66.76	36.5	464 additional calls
EMS Vehicles (ambulances)	1		Per 30,000 Population	1.00	1	0 ambulances
WATER CONSUMPTION						
Gallons per household/day	270	122,542	Daily Gallons per Household	270	175	521,072 gals of water
SOLID WASTE						
Landfilled (tons / day)	3.15		Daily Tons per Resident	0.000647	0.00175	4.50 tons per day
SEPTAGE SLUDGE						
Gallons per household per day	270	494,336	Gallons per Household/Day	270.00	n/a	764,640 gallons per day
General Government						
Employees	13		Full Time employees	***	***	6 Full Time employees

*** There are no standards in relation to General Government for a Town of Boxborough's size. The estimates of needs in ten years and at buildout were determined by local research

Boxborough Community Impact Assessment - MAPC Buildout

MAPC

Existing Conditions			Future Buildout			
2000 Population	4,868		Buildout Population	7,397	MAPC projections	
2000 Households	1931		Buildout Households	2,670	extrapolated	
2000 School Age Children	1,090		Buildout School Age Children	2,056	extrapolated	
2000 Elementary Age Children	631		Buildout Elemntary Age Children	1,193	extrapolated	
FACTOR		BOXBOROUGH DATA (existing service level)	STANDARD UNIT	BOXBOROUGH Existing Conditions (2000)	ULI STANDARD	BOXBOROUGH BUILDOUT Projected Need
SCHOOLS						
Students per Classroom	Classrooms	Students				
K-6	31	631	Students per Classroom	20.00	24	60 classrooms 50 ULI Standard
Student-Teacher Ratio	# Students	# Teachers				
K-6	631	45	Students per Teacher	14.00	22	85 teachers 54 ULI Standard
Total Space	Sq. Ft.	# Students				
K-6	75,210	631	Sq. Ft. per Student	119.19	90	142,148 sf school space 107,334
LIBRARY						
Book Holdings (total volumes)	28,565		Volumes per Capita	5.87	2.75-3	43,405 volumes 22191
Book Circulation (volumes)	38,242		Volumes per Capita	7.86	9.5	58,109 volumes 70271.5
CONSERVATION & SCHOOL LAND						
Land (acres)	1319		Acres per 1,000 Population	270.95	.25-8	2,004 acres of park land 5,918 ULI Standard
POLICE						
Police Officers	10		Per 1,000 Population	2.05	2	15 police officers
Vehicles (# of Patrol Cars)	5		Per 1,000 Population	1.03	0.6	8 police vehicles
Facility Space (SF)	4600		Sq. Ft. per 1,000 Population	944.95	200	6,990 sf police space
FIRE						
Personnel	4		Per 1,000 Population	0.82	1.65	12 fire personnel
Vehicles (non-engine, non-ambu	3		Per 1,000 Population	0.62	0.2	5 fire vehicles
Engines	5		Per 1,000 Population	1.03		8 fire engines
Facility Space (SF)	4625		Sq. Ft. Per 1,000 Population	950.08	250	7,028 sf fire space
EMS Calls (per year)	325		Per 1,000 Population	66.76	36.5	494 additional calls
EMS Vehicles (ambulances)	1		Per 30,000 Population	1.00	1	0 ambulances
WATER CONSUMPTION						
	122,542		Daily Gallons per Household	270	175	521,072 gals of water
	EOEA Estimate					
SOLID WASTE						
Landfilled (tons / day)	3.15		Daily Tons per Resident	0.000647	0.00175	4.79 tons per day
SEPTAGE SLUDGE						
Gallons per household per day	270	494,336	Gallons per Household/Day	270.00	n/a	721,007 gallons per day
General Government						
Employees	13		Full Time employees	***	***	6 Full Time employees

*** There are no standards in relation to General Government for a Town of Boxborough's size. The estimates of needs in ten years and at buildout were determined by local research.

Community Impact Assessment - EOEa Buildout

Existing Conditions			Future Buildout		
2000 Population	4,868	Buildout Population	6,935	EOEA data	
2000 Households	1,931	Buildout Households	2,935	EOEA data	
2000 School Age Children	1,236	Buildout School Age Children	1,394	EOEA data	
2000 Elementary Age Children	625	Buildout Elementary Age Children	808.52	extrapolated	
FACTOR	BOXBOROUGH DATA (existing service level)	UNIT	BOXBOROUGH Existing Conditions (2000)	ULI STANDARD	BOXBOROUGH BUILDOUT Projected Need
SCHOOLS					
Students per Classroom	Classrooms	Students			
K-6	31	625 Classroom	20.00	24	40 classrooms 34 ULI Standard
Student-Teacher Ratio	# Students	# Teachers			
K-6	625	45 per Teacher	14.00	22	58 teachers 37 ULI Standard
Total Space	Sq. Ft.	# Students			
K-6	75,210	625 per Student	120.34	90	97,294 sf school space 72,767
LIBRARY					
Book Holdings (total volumes)	28,565	Volumes per Capita	5.87	2.75-3	40,694 volumes 20805
Book Circulation (volumes)	38,242	Volumes per Capita	7.86	9.5	54,480 volumes 65882.5
CONSERVATION & SCHOOL LAND					
Land (acres)	1316	s per 1,000 Population	270.95	.25-8	1,879 acres of park land 5,548 ULI Standard
POLICE					
Police Officers	10	Per 1,000 Population	2.05	2	14 police officers
Vehicles (# of Patrol Cars)	5	Per 1,000 Population	1.03	0.6	7 police vehicles
Facility Space (SF)	4600	sf per 1,000 Population	944.95	200	6,553 sf police space
FIRE					
Personnel	4	Per 1,000 Population	0.82	1.65	11 fire personnel
Vehicles (non-engine, non-an)	3	Per 1,000 Population	0.62	0.2	4 fire vehicles
Engines	5	Per 1,000 Population	1.03		7 fire engines
Facility Space (SF)	4625	sf per 1,000 Population	950.08	250	6,589 sf fire space
EMS Calls (per year)	325	Per 1,000 Population	66.76	36.5	463 additional calls
EMS Vehicles (ambulances)	1	Per 30,000 Population	1.00	1	0 ambulances
WATER CONSUMPTION					
Gallons per household/day	270	122,542 Household	270	175	521,072 gals of water
SOLID WASTE					
Landfilled (tons / day)	3.5	daily Tons per Resident	0.000719	0.00175	4.99 tons per day
SEPTAGE SLUDGE					
Gallons per household per day	270	494,336 Household/Day	270.00	n/a	792,450 gallons per day
General Government					
Employees	13	Full Time employees	***	***	6 Full Time employees

*** There are no standards in relation to General Government for a Town of Boxborough's size. The estimates of needs in ten years and at buildout were determined by local research.

Appendix 10-1 A
Open Space Residential Design

OPEN SPACE RESIDENTIAL DESIGN

An Open Space Residential Design (OSD) shall refer to residential developments in which reduced lot sizes may be permitted in exchange for the protection of valuable open space and/or scenic vistas. The land not included in the building lots or street rights-of-way shall be dedicated as permanently preserved open space. Overall housing density will be based on that which could be built under a conventional development plan. The Planning Board has the authority and is encouraged to waive certain subdivision standards where the purpose and intent of this Open Space Residential Design bylaw supported by the proposal under consideration in Boxborough.

1.0 Purpose and Intent

- 1.1 To encourage the permanent preservation of open space, agricultural and forestry land, other natural resources including waterbodies and wetlands, historical and archeological resources.
- 1.2 To maintain the Town's traditional character and land use pattern in which small villages contrast with open land.
- 1.3 To allow for greater flexibility and creativity in the design of residential developments.
- 1.4 To protect scenic vistas from the Town's roadways and other places.
- 1.5 To facilitate the construction and maintenance of streets, utilities and public services in a more economical and efficient manner.
- 1.6 To protect existing and potential municipal water (surface and groundwater) supplies.
- 1.7 To allow for and encourage an efficient form of development that consumes less open land and conforms to existing topography and natural features better than a conventional subdivision.
- 1.8 To encourage the provision of diverse housing opportunities and the integration of a variety of housing types.
- 1.9 To further the goals and policies of the Boxborough Master Plan and other local plans.

2.0 Applicability

This bylaw shall be applicable to all proposals for residential subdivision of ten (10) acres or more that a) abut public or private conservation land or b) are located on scenic roads.

3.0 Procedural Requirements

3.1 Rules and Regulations

The Planning Board shall adopt Rules and Regulations consistent with the provisions of this bylaw and shall file a copy of said Rules and Regulations with the Town Clerk. Such rules, known as the "Rules and Regulations Governing the Subdivision of Land", shall address the size, form, contents, and number of copies of plans to be submitted, as well as additional design standards.

3.2 Pre-Application Meeting

A pre-application meeting between the Planning Board and or Town Planner and the applicant is strongly encouraged. This meeting is intended to promote better communication and to avoid misunderstandings, prior to preparation of a formal application for conventional or open space design subdivision.

3.3 Preliminary Submission

3.3.1 Two Plan Submission – Conventional and OSD

Where the land is so located, the applicant shall submit a preliminary plan illustrating 1) subdivision of the land under a conventional subdivision scenario, as well as 2) an open space design in accordance with this bylaw for review and comparison by the Planning Board. One of the purposes of this review is to determine the number of lots possible under the Open Space Residential Design, should the OSD be the preferable form of development. Approval of a preliminary plan pursuant to G.L. c. 41, §81-S may also shorten the period of review for the Definitive Subdivision and Open Space Design Plan.

The number of dwelling units permitted shall not exceed that which would be permitted under a conventional subdivision that complies with the Boxborough Zoning Bylaw and Rules and Regulations Governing the Subdivision of Land and any other applicable laws and regulations of the Town or the state

3.3.2 Existing Conditions Plan

An accompanying Existing Conditions Plan shall depict site features as available from existing information, including: existing topography, wetlands, waterbodies and the 100-year floodplain, all existing rights of way, easements, and existing structures, the location of significant features such as woodlands, tree lines, open fields or meadows, scenic views, watershed divides and drainage ways, fences and stone walls, roads, driveways, and cart paths. Abutting land owned by the Town of Boxborough or other non-profit conservation or preservation entity shall be specifically identified. These details will be defined more specifically at the Definitive plan stage.

3.3.3 Planning Board Direction/ Presumptions

The Planning Board shall hold a meeting to review the two development scenarios, including the opportunities and constraints of each. In evaluating the plans, the Planning Board shall consider the ability of each development scenario to satisfy the following criteria:

- Preservation of the historic, cultural and rural character of the town;
- Preservation of natural resources;
- Integration of the proposal with the existing neighborhood;
- Ability to create connections to existing trails or to enhance existing open spaces;
- Preservation of views along scenic roadways;
- Opportunity for public amenities such as recreation or public access;
- Provision of diverse housing types.

Following the evaluation, the Board shall direct the applicant to proceed with a proposal for either the OSD or the conventional scenario and shall specify its priorities in terms of plan elements (e.g. preservation of scenic road frontage, larger lot size, connection of trail network). It is not presumed that the OSD will always result in a better alternative.

Where the open space provided is of little value and the considerations above cannot be successfully provided in an OSD, the conventional form of subdivision may be most desirable.

The Planning Board shall direct the applicant to proceed in accordance with the OSD upon a finding that it complies with the purpose and intent of this section and is superior in design to a conventional subdivision with regard to protection of natural features and scenic resources of the site and of the community.

3.4 *Definitive Open Space Design Plan*

3.4.1 *Definitive Plan*

If the Planning Board directs the applicant to proceed in accordance with the conventional subdivision plan, the applicant shall do so in accordance with the Rules and Regulations for the Subdivision of Land. Alternatively, if an Open Space Design is preferred, the criteria herein shall supercede the definitive plan requirements insofar as those requirements conflict with those specified herein.

The OSD Definitive Plan shall show the following features, which shall be presumed to be necessary, unless the Planning Board determines any particular feature is not relevant or helpful to the review: location and boundaries of the site, proposed land and building uses, lot lines, location of existing and proposed open spaces, proposed grading, location and width of streets and ways, parking, street and common area landscaping, existing vegetation to be retained, water supply or approximate location of wells, septic systems, drainage, and easements.

The plan shall be prepared by a team including a Registered Civil Engineer, Registered Land Surveyor, and a Registered Landscape Architect as appropriate to ensure a design most sensitive to the land and resources of the development site. Applicants shall also include a statement indicating the proposed use and ownership of the open space as permitted herein.

3.4.2 *Site Analysis*

Expanding on the Existing Conditions Plan, a Site Analysis shall be performed and described, showing locations of soil test pits and percolation tests, with supporting documentation on soils test results, traffic impact, and drainage.

3.4.3 *Waiver of Requirements*

The plan contents stated in section 3.4 are mandatory unless specifically waived at the discretion of the Planning Board under the provisions of G.L. c. 41 §81-R, and only upon a finding that the requested information will not aid in consideration of the proposed project.

3.5 *Review and Decision*

Upon receipt of a complete application and the required plans, the Planning Board shall distribute copies to other local boards and commissions in accordance with the Subdivision Rules and Regulations. The Planning Board shall hold a public hearing and shall act on applications according to the procedure specified in the Subdivision Rules and Regulations and

in accordance with the Massachusetts Subdivision Control Law. Notice shall be provided of hearings in accordance with M.G.L. chapter 41, § 81T.

The approval of a Definitive Plan for Open Space Residential Development shall be conditioned to provide that no further division of land which increases the number of lots or results in an alteration to the area to be set aside as open space may occur without a modification of the subdivision approval. Any significant alteration of lot lines or layout of ways shall require approval of the Planning Board and shall be in compliance with the requirements of this section and M.G.L. chapter 41 §81-W. The Planning Board may allow insignificant changes without a public hearing.

3.6 Relationship to Subdivision Control Law and other Regulations

Nothing contained herein shall exempt a proposed subdivision from compliance with applicable provisions of the Town of Boxborough's Zoning Bylaw or Subdivision Rules and Regulations that are not covered by this section, nor shall it affect the right of the Board of Health and of the Planning Board to approve, condition or disapprove a subdivision plan in accordance with the provision of such Rules and Regulations and of the Subdivision Control Law. This section shall not exempt a proposed subdivision from other applicable regulations, including those of the Board of Health, Conservation Commission or State and Federal agencies. It is the applicant's responsibility to ensure that all necessary permits are obtained.

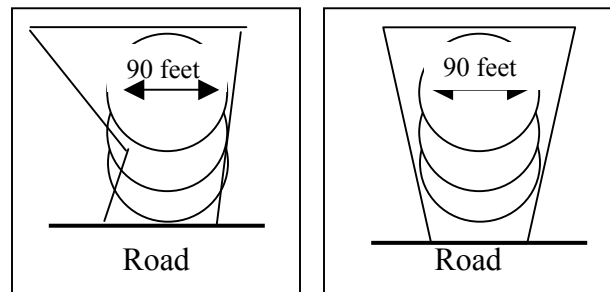
4.0. Standards and Dimensional Requirements

Where the requirements of this section differ from or conflict with the requirements in the Table of Density and Dimensional Standards found elsewhere in this bylaw, the requirements of this section shall prevail.

4.1 Dimensional Requirements

The Planning Board may allow a minimum lot size of no less than 40,000 square feet per lot. The standard requirements for front, side and rear yards, as well as building height apply to an OSD as they do for conventional subdivisions. The required lot frontage may be reduced to a minimum of 125 feet and similarly, lot width may be reduced to no less than 90 feet. The reduced standards provided herein shall apply only to lots fronting on internal roadways and shall not apply to the roadways from which the OSD subdivision is accessed.

All building lots must be able to contain a circle of a minimum diameter of 90 feet from the front lot line to the building line, the shortest distance between the two sidelines and intersecting the front of the primary structure on the lot. *See illustrations at right.*

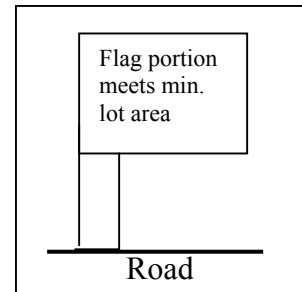


Not Acceptable

Acceptable

4.2 Flag Lots

Flag lots with a minimum frontage and width of 50 feet at any point may be permitted in an Open Space Design, provided that the pole portion does not exceed 300 feet in length, and the flag portion meets all applicable lot requirements in section 4.1 above. Shared driveways are required where flag lots abut one another to reduce curb cuts along the road.



4.3 Required Open Space

All land area not utilized for lots, roads, and drainage shall be set aside as open space. A minimum of 35% open space shall be provided; of this, 50% of the minimum open space area shall be upland. For example, a 100 acre parcel containing 30 acres of wetland shall provide 35 acres of open space of which at least 17.5 acres are upland.

Applicants are encouraged to include wetlands and waterbodies within the open space, however they do not count toward the required upland portion of the open space. Roadway right-of-ways shall not count toward the area to be provided as open space. Areas of dedicated open space in excess of the minimum requirement may contain any percentage of wetlands, waterways or steep slopes, and may contain common well or drainage facilities, in addition to recreational facilities such as buildings, parking stalls and picnic areas.

5.0 Permissible Uses of Open Space

5.1 Purposes

Open space shall be used solely for conservation, recreation, agriculture or forestry purposes by residents and/or the public. Where appropriate, multiple use of open space is encouraged. At least half of the required open space may be required by the Planning Board to be left in a natural state. The proposed use of the open space shall be specified in the application. If several uses are proposed, the plans shall specify what uses will occur in what areas. The Planning Board shall have the authority to approve or disapprove particular uses proposed for the open space.

5.2 Recreation Lands

Where appropriate to the topography and natural features of the site, the Planning Board may require that at least 10% of the open space or two acres (whichever is less) shall be of a shape, slope, location and condition to provide an informal field for group recreation or community gardens for the residents of the subdivision.

5.3 Accessory Structures

Up to 5% of the open space may be set aside and designated to allow for the construction of structures and facilities accessory to the proposed use of the open space including parking, garden or recreation storage sheds.

6.0 Ownership of Open Space

6.1 Ownership Options

At the developer's option and subject to approval by the Planning Board, all areas to be protected as open space shall be held by one or a combination of the following parties.

- 6.1.1 Town of Boxborough - to be placed under the care, custody and control of the Conservation Commission [the Conservation Commission shall have the authority to delegate such control as it deems necessary and appropriate] and be accepted by it for a park, conservation, active or passive recreation. Land conveyed to the Town should be open for public use, as deemed appropriate by the controlling party;
- 6.1.2 Non-profit organization - the principal purpose of which is the conservation or preservation of open space, as specified in section 6.2 below. Such organization shall be acceptable to the Town as a bona fide conservation organization (e.g. the Boxborough Land Trust);
- 6.1.3 Homeowners Association - a corporation or trust owned by the owners of lots or residential units within the development and where land is placed under Conservation Restriction, as specified in section 6.2 below. If such a corporation or trust is utilized as indicated herein, ownership thereof shall run with the land. The developer is responsible for the maintenance of the open space and other facilities to be held in common until such time as the homeowners association is capable of assuming such responsibility. Thereafter, the members of the association shall share the cost of maintaining the open space. The Planning Board shall require the applicant to provide evidence of creation of the homeowner's association prior to the conveyance of any lots within the subdivision.
- 6.1.4 Individual – in limited situations, the Planning Board may authorize that the open space will be retained by an individual property owner. These situations will be evaluated on a case-by-case basis, and are most desirable where land will be reserved for active agricultural use. Where an individual property owner retains ownership of the open space, the provisions of section 6.2 below shall apply.

6.2 Permanent Restriction

In any case where open space is not conveyed to the Town, a permanent conservation restriction or Agricultural Preservation Restriction (APR) in accordance with M.G.L. chapter 184 §31-33 approved by the Planning Board and Board of Selectmen and enforceable by the Town, conforming to the standards of the Massachusetts Executive Office of Environmental Affairs, Division of Conservation Services, shall be recorded to ensure that such land shall be kept in an open or natural state and not be built upon for residential use or developed for accessory uses such as parking or roadways except as permitted by this bylaw and approved by the Planning Board. Restrictions shall provide for periodic inspection of the open space by the Town. Such restriction shall be submitted to the Planning Board prior to approval of the project and recorded at the Registry of Deeds/Land Court simultaneously with recording of the definitive subdivision plan. The Planning Board may require a management plan that describes how existing woods, fields, meadows or other natural areas shall be maintained in accordance with good conservation practices.

Where the open space is deemed to be not acceptable under the statutory provisions above, the land may be protected by an alternative means, such as a development restriction that is recorded and runs with the land in perpetuity.

6.3 Encumbrances

All areas to be conveyed as open space shall be conveyed free of any mortgage interest, security interest, liens or other encumbrances. This clause shall not apply to an individual who holds property subject to an APR or CR as described in sections 6.1.4 and 6.2 above.

6.4 Maintenance of Open Space

In any case where open space is not conveyed to the Town, the Town shall be granted an easement over such land sufficient to ensure its perpetual maintenance as conservation or recreation land. Such easement shall provide that in the event the association or other owner fails to maintain the open space in reasonable condition, the Town may, after notice to the lot owner(s) and public hearing, enter upon such land to maintain it in order to prevent or abate a nuisance. The cost of such maintenance by the Town shall be assessed against the properties within the development and/or to the owner of the open space. The Town may file a lien against the lot or lots to ensure payment of such maintenance expenses.

6.5 Monumentation

Where the boundaries of the open space are not readily observable in the field, the Planning Board may require placement of surveyed bounds sufficient to identify the location of the open space.

7.0 Design Requirements

The location of open space provided through this bylaw shall be consistent with the policies contained in the Boxborough Master Plan and Open Space and Recreation Plan. The following design requirements shall apply to open space and lots provided through this section.

7.1 Open Space Location / Greenways

- 7.1.1 Open space shall be planned as large, contiguous areas whenever possible. Long thin strips or narrow areas of open space (less than 100' wide) shall occur only when necessary for access, as vegetated buffers along wetlands, or as connections between open space areas.
- 7.1.2 Open space shall be arranged to protect valuable natural and cultural environments such as stream valleys, wetland buffers, unfragmented forestland and significant trees, wildlife habitat, open fields, scenic views, trails, and archeological sites and to avoid development in hazardous areas such as floodplains and steep slopes. The development plan shall take advantage of the natural topography of the site, and cuts and fills shall be minimized.
- 7.1.3 Development along existing scenic roads, whether designated as such or not, and creation of new driveway openings on existing scenic roadways shall be minimized. The open space buffer along such scenic roads shall be maximized, but in no case shall the distance between a scenic road right-of-way and the nearest residential lot line be less than 200 feet.
- 7.1.4 The Open Space may be in more than one parcel provided that the size, shape and location of such parcels are suitable for the designated uses. Where feasible, these parcels shall be linked by trails and/or sidewalks.
- 7.1.5 Where a proposed development abuts land held for conservation purposes, the development should be configured to minimize adverse impacts to abutting

conservation land. OSD open space and trail connections should be provided adjacent to such conservation land where appropriate and feasible.

7.2 Open Space Access

- 7.2.1 Dedicated open spaces shall be laid out in conjunction with existing and proposed streets and sidewalks so that the greatest degree of internal pedestrian circulation and physical or visual access to the open space is achieved. Where the open space is to be owned by the Town, adequate provisions shall be included to accommodate public use, including locations for placement of parking and signs.
- 7.2.2 Open space shall be provided with adequate access, by a strip of land at least 20 feet wide, suitable for a footpath, from one or more streets in the development. An exception may be made for resource areas vulnerable to trampling or other disturbance.
- 7.2.3 Lots and streets have been located to avoid or minimize adverse impacts on open space areas and to provide views of and access to the open space.

7.3 Landscaping

- 7.3.1 Naturally occurring vegetation shall be conserved to the greatest extent feasible, especially along existing town roads. Landscaping and tree removal is subject to the approval of the Board prior to any work and final approval of the Open Space Design.
- 7.3.2 Common areas such as community greens, cul-de-sac islands, and both sides of new streets shall be landscaped with deciduous shade trees (minimum 2 ½ - inch caliper at chest height) and or flowering shrubs with high wildlife conservation value. The suggested street tree interval is 30 to 50 feet, as appropriate according to species selected and site-specific factors, at the discretion of the Planning Board.

7.4 Agricultural Areas

In agricultural areas, lots shall be laid out to the greatest extent feasible, to achieve the following objectives, without conflicting with the provisions of section 7.0 herein.

- Developed areas are located on the least fertile soils for agricultural use so that land mapped as “prime agricultural land” or of “state importance” by the U.S.D.A. Natural Resources Conservation Service in the “Field Office Technical Guide for Massachusetts” will remain available for future agricultural use.
- Structures are located within any wooded upland on the parcel, or along the far edges of open fields to the greatest extent possible.
- Residential and agricultural areas are situated to minimize the lengths of any common boundaries between new house lots and lands preserved for agriculture.
- Dwelling units and non-agricultural structures are separated from the agricultural uses by a 100 foot wide buffer strip of trees and native plantings sufficient to reduce conflicts between farming operations and residents.

7.5 Forestry Areas

In forested areas where there exists a potential for a sustained-yield of forest products (based on existing vegetation, parcel size, contiguity with other forestry parcels, and forestry site indices), lots shall be laid out, to the greatest extent feasible, to achieve the following objectives.

- Areas of older growth forest or productive forest soils are included in the dedicated open space.

- Access for logging equipment is provided in a manner that does not conflict with residential uses.
- Adequate buffering is provided in order to minimize disruption of residential areas or conflicts with the use of other open space areas, and to assure the safety of the residents.

8.0 Modification of Subdivision Roadway Standards

The Planning Board may reduce applicable subdivision road construction standards (roadway width, centerline radii, curbing, cul-de-sac radius, drainage requirements, etc.) in exchange for the provision of greater than 60% open space within the OSD, where, in the opinion of the Planning Board, such reductions will result in enhanced overall site design and provide adequate and safe access for the development. Where this section applies, the Planning Board may apply the “rural subdivision” standards, which may be incorporated into the Subdivision Rules and Regulations.

This section can be adopted as a zoning bylaw [4900. Open Space Residential Design] or alternatively be incorporated to the Subdivision Rules and Regulations; if included within zoning, the Subdivision regulations will likely need updating for consistency and design specific criteria. If the provisions of this section are located within subdivision, the following applicable dimensional requirements should be included within the zoning bylaw as “OSD” within section 2310.

- Min. Lot – 40,000 sf
- Min. Upland – 20,000 sf
- Min. Frontage – 125 feet
- Min. lot width – 90 feet
- Min. front setback – 40 feet
- Min. side setback – 30 feet
- Min. rear setback – 40 feet
- Maximum stories - 3
- Max. bld. Height – 45 feet
- Max. Lot coverage – n/a
- FAR – n/a
- Min. Open Space – 35%

For Questions or Comment Please Contact:

Alicia Altieri, Town Planner at (978) 263-1116 or
 Pamela Brown, Esq. by email at pbrown@brown-brown-pc.com

This draft prepared by BROWN & BROWN, P.C. as part of the Master Plan prepared by Beals and Thomas, Inc. 2001.

Appendix 10-1 B
Inclusionary Housing

TOWN OF BOXBORO

Inclusionary Housing

Background – Documentation of Need for Zoning Amendment

- The Boxboro Master Plan consultants and steering committee recommend a proactive approach to providing affordable housing at a scale suited to the community's rural character and population.
- Massachusetts statute G.L. c. 40B §20-24 imposes a policy that every community provide 10% of its housing stock as housing accessible to families of low and moderate incomes.
- Town's that have not met this minimum standard are more vulnerable to comprehensive permit projects under the statute. Such projects can proceed with permitting without compliance with many local regulations, especially density.
- The proposed section provides that new development be required to provide a proportionate share of affordable housing so that the existing stock of affordable housing is not diluted by the production of additional market rate housing units.
- A flexible standard is provided so that the required affordable units can be provided on or off the site of proposed market rate housing and could include homeownership or rental units, so long as the Commonwealth's criteria of affordable housing units, as well as local rules and regulations are satisfied.

INCLUSIONARY HOUSING BYLAW

1.0 Purpose and Intent

The purpose of this bylaw is to proactively provide for the development of affordable housing in compliance with G.L. c. 40B §20-24, so that the Town's stock of affordable housing is not diluted by the creation of additional market rate units. It is intended that the affordable housing units that result from this bylaw qualify as Local Initiative Units in accordance with the Massachusetts Division of Housing and Community Development guidelines, and therefore units must comply with these guidelines.

2.0 Applicability

This section shall apply to all conventional and open space design subdivisions allowed by M.G.L. c. 41 that create six (6) or more lots, including those divisions of land that do not require subdivision approval. [It is presumed that divisions of land creating less than 6 lots would be rounded down and thus make the calculation of required units 0 and this bylaw inapplicable.]

3.0 Anti-Segmentation

It is the intent of this bylaw to prohibit the subdivision of land or phasing of development to avoid the application of this section. It shall be presumed that land held in common ownership at the time of enactment of this bylaw should be included for the purposes of calculating the number of lots. It shall also be presumed that phased development of land

held in common ownership shall be considered in its totality rather than as separate projects. These presumptions are rebuttable only upon credible evidence to the contrary. Where a division of land appears to be phased, a covenant may be placed on the remaining land requiring compliance with this bylaw.

4.0 Mandatory Provision of Affordable Units

The Planning Board shall, as a condition of approval of any development referred to in Sections 3.0 above, require that the applicant comply with the obligation to provide affordable housing pursuant to this bylaw and more fully described in Section 5.0.

5.0 Provision of Affordable Units

The Planning Board shall deny any application for subdivision, open space design development, or ANR endorsement of plans showing six (6) lots or more, or that when considered in relation to other development phases or development on adjacent property in common ownership create six (6) lots or more, that does not provide at least ten (10) percent of the units subject to this bylaw as affordable housing units in any one or combination of methods provided for below:

- (a) by constructing, rehabilitating or designating affordable housing unit(s) on the locus subject to the application (see Section 6.0); or
- (b) by constructing rehabilitating or designating affordable housing unit(s) on a locus different than the one subject to the application (see Section 7.0); or
- (c) by offer to and acceptance by the Housing Board of a donation of land to the Town or its designee in fee simple, on- or off-site, that the Planning Board in its discretion determines is suitable for the construction of affordable housing units. Where this option is used, said land shall be sufficient to support a number of affordable housing units equal to two (2) times the number of units required by section 6.3.
- (d) at the discretion of the Housing Board, by development of a qualifying affordable housing unit on public land through rehabilitation or new construction
- (e) any combination of the above requirements (a)-(c) provided that in no event shall the total number of units or land area provided be less than the equivalent number or value of affordable units required by this bylaw.

For example, a 18-lot subdivision would require an exaction of 2 affordable housing units, which could be provided by construction of one unit in the proposed subdivision and one rental unit in the town center; or alternatively, a donation of land sufficient for the Town to construct four units of affordable housing. Flexibility is allowed and encouraged. An 8 lot division would require one affordable unit, as would a 12 lot division.

6.0 Provisions Applicable to Affordable Housing On- and Off-Site

6.1 Siting of affordable units

All affordable units constructed, rehabilitated or designated under this bylaw shall be dispersed throughout the development and/or community and shall, on average, be no less accessible to public amenities, such as open space or services, than the market-rate units.

6.2 Minimum standards for affordable units

Affordable housing units within market rate developments shall be integrated with the rest of the development and shall be compatible in design, appearance, construction and quality of materials with other units. Interior features of affordable units shall include similar amenities. Off-site affordable units shall be integrated with the neighborhood in which they are situated.

6.3 Calculation of number of affordable units

A number of affordable units equal to ten percent (10%) of the total number of units shall be provided. Fractions of units shall be rounded up if the fraction is 0.7 or greater and shall be rounded down if said fraction is less than 0.7.

6.4 Timing of construction or provision of affordable units or lots

Where feasible, affordable housing units shall be provided coincident to the development of market-rate units, but in no event shall the development of affordable units be delayed beyond the schedule noted below.

Building Permits for Market-rate Units (% issued)	Construction Starts for Affordable Housing Units			
	Total # affordable units required			
	1*	2*	3	4+
Up to 30%				None required
30% plus 1 unit			1	25%
50%	1	1		50%
75%			1	75%
90%		1	1	100%

** Fractions of units shall be rounded up. Where only one affordable unit will be constructed, the unit shall be commenced prior to commencement of the unit representing 50% of the number of lots permitted; where two affordable units are required, one shall be commenced prior to commencement of the unit representing 50% of the number of lots permitted and the second shall be constructed prior to receipt of a building permit for the last approved lot.*

6.5 Marketing plan for affordable units.

Applicants under this bylaw shall submit a marketing plan to the Planning Board for its approval, which describes how the affordable units will be marketed to potential homebuyers or tenants. This plan shall include a description of the lottery or other process to be used for selecting buyers or tenants. The Housing Board shall develop a sample marketing plan and lottery and copies shall be made available in the Planning Office.

6.6 *Local preference.*

At the discretion of the Planning Board, up to 70% of the affordable units can be reserved for Boxborough residents. For the purpose of this section “resident” shall be defined as any resident, individual who previously lived in Boxborough for at least two (2) years or child of a Boxborough resident who does not currently live in Town, or employee of the Town of Boxborough. In the event that the applicant is unable to sell or lease the unit to a Boxborough resident s/he may petition the Planning Board for a release of the condition, without need for a public hearing.

7.0 *Provision of Affordable Housing Units Off-Site*

As an alternative to on-site provision of affordable housing described in Section 6.0, an applicant subject to the bylaw may develop, construct, rehabilitate or dedicate affordable units off-site. All requirements of this bylaw that apply to on-site provision of affordable units, shall apply to provision of off-site affordable units. In addition, the location of the off-site units to be provided shall be approved by the Planning Board, which shall have discretion to approve the appropriateness of a proposed unit to be designated as off-site affordable housing.

8.0 *Maximum Incomes and Selling Prices*

8.1 *Rental Prices and Initial sale*

The maximum housing cost for affordable homeownership or rental units created under this bylaw is as established by the Commonwealth’s Division of Housing and Community Development, Local Initiative Program.

To ensure that only eligible households purchase affordable housing units, the purchaser of a affordable unit will be required to submit copies of the last three years’ federal and state income tax returns and certify, in writing and prior to transfer of title, to the developer of the housing units or developer’s agent, and within thirty (30) days prior to transfer of title, to the local housing partnership or other agency as established by the Town, that his/her or their family’s annual income level does not exceed the maximum level as established by the Commonwealth’s Division of Housing and Community Development, as may be revised from time to time. Applicants for rental housing shall provide similar documentation.

8.2 *Preservation of affordability*

Each affordable unit created in accordance with this bylaw shall have limitations governing its rental rates, sale and resale prices. The purpose of these limitations is to preserve the long-term affordability of the unit and to ensure its continued availability for affordable income households. The resale controls shall be established through a restriction on the property running with the land and shall be perpetual. The Planning Board shall keep affordable housing criteria and guidance documents provided by the Massachusetts Division of Housing and Community Development in addition to any local guidelines that the Planning Board may hereinafter adopt.

The Planning Board shall require, as a condition for approval under this bylaw, that the applicant comply with the mandatory affordable housing provisions and accompanying restrictions on affordability, including the execution of a DHCD Local Initiative Program Regulatory Agreement (for rental and homeownership units) and deed rider (for homeownership units). The Building Inspector shall not issue an occupancy permit for any affordable unit until the deed restriction is recorded.

9.0 Conflict with Other Bylaws

The provisions of this section shall be considered supplemental to other zoning bylaws. To the extent that a conflict exists between this section and others, the more restrictive provisions shall apply.

For Questions or Comment on this Draft, please contact:

Alicia Altieri, Town Planner at (978) 261-1116
Or Pamela Brown, Esq. by email at pbrown@brown-brown-pc.com